IMAGE

THE JOURNAL OF THE GEORGE EASTMAN HOUSE OF PHOTOGRAPHY

NUMBER 2 • JUNE 1959

THE JOURNAL OF P

IMAGE

TABLE OF CONTENTS

COVER PHOTOGRAPH, FOX TALBOT: LACE, PHOTOGENIC DRAWING, 1843	
EDITORIAL	58
WILLIAM HENRY FOX TALBOT	60
NOTES ON THE PUBLICATION OF THE PENCIL OF NATURE	75
THE PENCIL OF NATURE	77
INGMAR BERGMAN	106
BOOK REVIEWS	108
NEWS AND NOTES	111
QUARTERLY NOTES	112

PHOTOGRAPHY AND MOTION PICTURES

IMAGE STAFF

BEAUMONT NEWHALL, *Director;* NATHAN LYONS, *Managing Editor;* JAMES CARD, *Curator of Motion Pictures;* GEORGE PRATT, *Assistant Curator of Motion Pictures;* WALTER CHAPPELL, ROBERT DOTY, *Editorial Assistants;* WARREN STEVENS, *Staff Photographer.*

IMAGE is published quarterly for the George Eastman House Associates, 900 East Avenue, Rochester 7, New York.

Copyright 1959 by George Eastman House, Inc. All rights reserved. Printed in the U.S.A.

MEMBERSHIP FEE in the George Eastman House Associates including four issues of IMAGE: U. S., Canada, Mexico, South and Central America and U. S. Possessions, $5.00 per year. Single copies to non-members are $2.00 each. Memberships by persons overseas may be purchased with UNESCO coupons at $5.00.

JUNE 1959

VOLUME 8 · NUMBER 2

EDITORIAL

PROPHETIC PIONEER

To William Henry Fox Talbot we owe the negative-positive system of photography which is the basis of all modern techniques. With his restless spirit of scientific inquiry, he did not stop with this invention, but predicted much that was to be developed. While it is true that Daguerre's perfection of the direct positive system conceived by Niépce first launched photography as a practical and popular means of picture making, Talbot's process became the basis of the techniques that were to outstrip Daguerre's work and render it obsolete in the short span of 12 years.

Again and again Talbot's contributions have been hailed by historians: from the outset he never suffered the fate of the prophet without honor. Historians have almost universally given him the credit which he so justly deserved. His countrymen have periodically honored him: the Royal Photographic Society made him an honorary member; his apparatus and some of his photographs have been on public exhibition for years at the Science Museum in London; his country home at Lacock is protected as an historic monument by the National Trust; and the complete count of the articles which have been written about him and his work is staggering. In-

deed, far more has been written about Fox Talbot than about Daguerre. Yet the exact nature of his contribution has never been fully appraised, and no full-length biography has yet appeared.

Happily this lack is being remedied. Mr. Harold White, long an admirer of Talbot and an ardent student of his life, has been painstakingly collating the quantities of letters, documents and photographs which Talbot left behind in Lacock Abbey. Before she died, Miss Matilda Talbot, O.B.E., appointed Mr. White as the official biographer of her distinguished grandfather. We can look forward to an account of Talbot's life based for the most part on unpublished material and covering all of Talbot's activities, for photography was but one of the interests of this extraordinary Victorian.

During his lifetime, Talbot recounted his photographic experiences in several publications. Of these, the most complete statement was in his remarkable book, *The Pencil of Nature*. In 1844, while his early experiments were fresh in his mind, Talbot decided to put on record "some of the early beginnings of a new art before the period which we trust is approaching, of its being brought to maturity by the aid of British talent." Talbot documented his account with actual examples of his work: in each installment of the book – it was published in six parts – he pasted photographic prints. There were 24 of these calotypes in all.

The edition of *The Pencil of Nature* was limited, probably because of the difficulties of this type of publishing. A world-wide search has disclosed only 24 existing copies, few of which are complete. Because of the instability of the process, the calotypes in these copies vary greatly in quality; not one copy which we have seen contains good prints of all 24 illustrations. Fortunately, Mr. White found in Lacock Abbey a few of the original negatives and excellent prints of all of the illustrations, as fresh as the day when they were made. To supplement the two copies of *The Pencil of Nature* in the George Eastman House Collection, Mr. White has most generously made available copies of these pristine photographs. They enable us to visualize *The Pencil of Nature* as it must have looked in 1844; they force us to revise our opinion of Talbot as a photographer, long based on faded images.

Because of its importance in the history of photography, we are proud to republish, for the first time anywhere, the entire text of *The Pencil of Nature* with reproductions of all of the photographs supplied by Mr. White. Before her death, Miss Talbot graciously consented to our request to dedicate this edition to her; it is with a feeling of respect that we now dedicate it to her memory. Miss Talbot spent most of her life in the preservation of Fox Talbot's work, not alone in photography, but in the other manifold fields of his activity. Before her death she turned over Lacock Abbey to the National Trust, and her concern for the welfare of the village of Lacock and its people was as self-sacrificing as it was self-effacing.

To enable our readers to grasp the significance of *The Pencil of Nature* in particular and the contributions of Fox Talbot in general, we print by way of introduction a short life of the English scientist and inventor. It is a revision of a two-part article which was first published in *Modern Photography* magazine.

It is our intention to republish from time to time other classics of the history of photography which, by their rarity, are inaccessible, and thus to provide our readers sources which are indispensable to our understanding of photography.

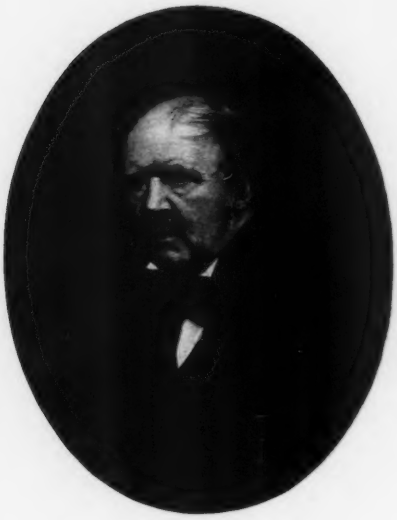
BEAUMONT NEWHALL, *Director*

1800-1877

WILLIAM HENRY

MODERN PHOTOGRAPHIC TECHNIQUES are based on the invention first made public in 1839 by William Henry Fox Talbot, an English scientist, mathematician, botanist, linguist, archaeologist, and country gentleman. At first eclipsed by the simultaneous, yet independent, invention of Louis Jacques Mandé Daguerre, Talbot's process pointed out the very path that was to be followed in the years to come. To Talbot we owe the concept of negative and positive, which has become basic, the making of prints on paper, enlarging, developing the latent image, the use of a halftone screen to print gray with black ink, and exposure by electric flash. All these techniques he demonstrated. Others he prophesied, such as photography with the invisible rays. The word "photography" itself was coined to describe his invention.

Talbot first had the idea of what he called "photogenic drawing" while he was traveling in Italy in 1833. He was 33 then, and had already distinguished himself in the world of science. He was a Fellow of the Royal Society – the oldest and most respected scientific body in Great Britain. He was a frequent contributor to learned journals. He had a taste of politics when he ran successfully as Member of Parliament from Chippenham, the nearest town in Wiltshire to Lacock Abbey, the beautiful country estate which he inherited from his father, William Davenport Talbot. While he was campaigning, he became engaged to Constance Mundy. They were married in December. And now, after the spring recess of the House of Commons, he had taken his wife abroad on the Grand Tour.



FOX TALBOT

To make records of their travels, Talbot, who was no artist, took along a camera lucida. This newly invented optical instrument made it possible to see, through a glass prism, the scene and the drawing paper at the same time. Theoretically, it was simple to trace with a pencil the image superimposed on the paper. But Talbot found it difficult. He was drawing a picture of Lake Como: "the faithless pencil," he complained, "only left traces on the paper melancholy to behold." He then thought of trying another device which amateurs before him had found useful — the camera obscura. Like the reflex camera of today, this was essentially a box with a lens which formed an image on a horizontal ground glass where it could be traced on thin paper. But Talbot had no better success with this instrument. He was all the more disappointed, for he was captivated by the beauty of the images. "Fairy pictures," he called them, "creations of a moment, and destined as rapidly to fade away." He thought that there must be some more efficient way to capture these elusive images than the faithless pencil. "The picture," he reasoned, "is but a succession of stronger lights thrown upon one part of the paper, and of deeper shadows on the other. Now light, where it exists, can exert an action. . . . Suppose the paper could be visibly changed by it. . . ." He resolved to make experiments to achieve that result.

In Italy at Bellagio, dreaming of what might be done, Henry Fox Talbot had no idea that others had preceded him. He did not know then that Thomas Wedgwood

1. FOX TALBOT: Sketch made near Bellagio in 1833, probably with a camera lucida. Royal Photographic Society, London.

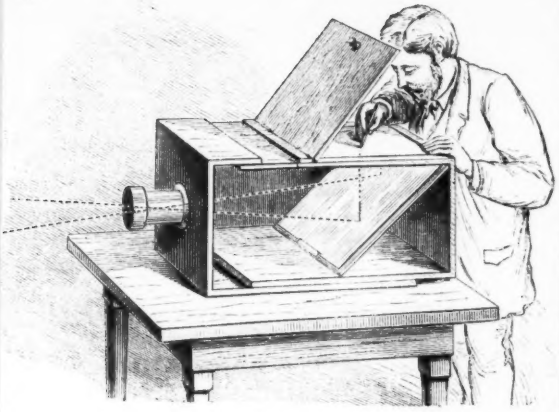
2. This model of the camera obscura was a rectangular wooden box formed of two parts, which slid in and out. The rays passed into it by a double convex lens and formed an image on the viewing glass when reflected from the glass mirror which was inclined at an angle of 45 degrees.

3. A variation on the camera obscura was this portable field model.

4. The camera lucida has been used extensively by illustrators to the present day. By looking through a prism, the viewer sees a virtual image of the object which he wishes to draw, apparently superimposed on the paper placed beneath the camera lucida.

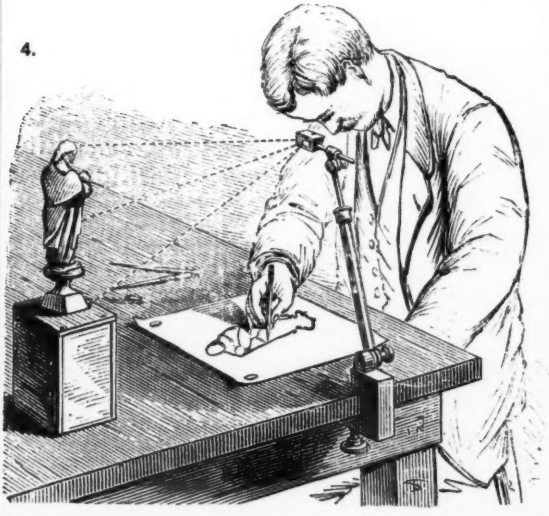
1.

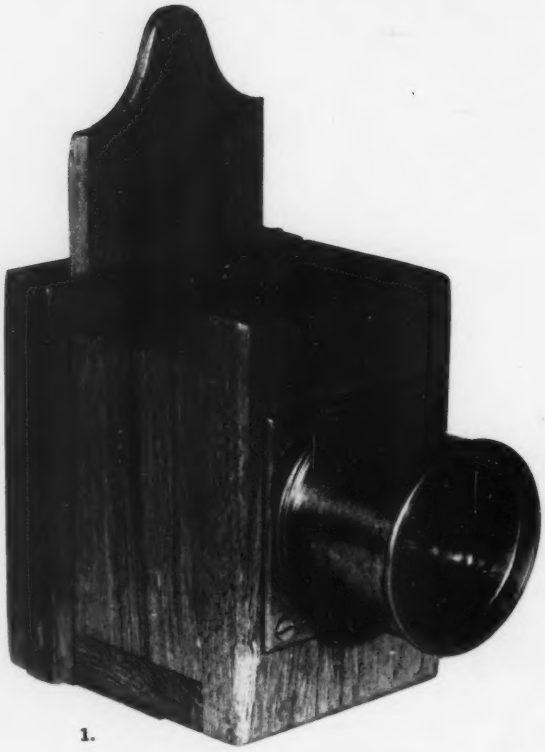
2.



3.

4.



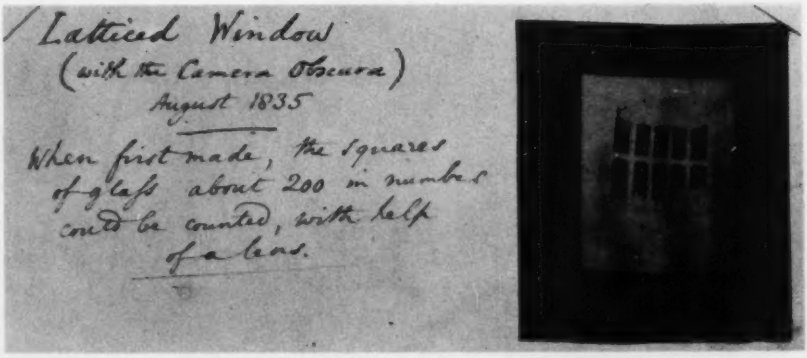


1.

1. Exact replica of a box camera, 5 inches high, used by William Henry Fox Talbot about 1839. Made by the Kodak Society of Experimental Engineers and Craftsmen, Harrow, England and presented to the George Eastman House. Photogenic paper was sandwiched between a glass plate and wooden back of holder.

2. Negative of a lattice window at Lacock Abbey, Wiltshire made by Fox Talbot in August 1835. This rare original, mounted and annotated by Talbot is now in the Science Museum, London: the gift of Miss M. T. Talbot.

2.


Latticed Window
(with the Camera Obscura)
August 1835
When first made, the squares of glass about 200 in number could be counted, with help of a lens.

had tried in 1802 and failed. He did not know that Nicéphore Niépce, who had just died in Paris, had succeeded in 1826 in making a crude photograph, and that his surviving partner, Louis Jacques Mandé Daguerre, was at that very moment secretly perfecting the invention which was to become world famous as the daguerreotype.

Back home in England at Lacock Abbey, in January of 1834, Talbot began to work out a technique. At first he tried to make paper light sensitive by brushing it with silver nitrate in solution. It did not react to light rapidly enough, and so he tried another chemical, silver chloride, which was also known to turn dark in light. But since this silver salt is not soluble in water, he could not simply brush it on paper. Instead he made it freshly, pouring a solution of common salt (sodium chloride) into a solution of silver nitrate. The mixture at once became cloudy and the silver chloride fell to the bottom of the container as a whitish precipitate. He took this moist material and spread it on paper. But again the paper did not react to light rapidly enough.

Talbot next reasoned that he could create silver chloride in the fibers of the paper by brushing it first with a solution of common salt, and then with the silver nitrate solution. By accident he found that if the salt solution was weak, the paper quickly turned dark in light. If, on the other hand, the salt solution was strong, the paper was hardly light sensitive at all. This gave Talbot a method of preserving his images from further light action, for when the sensitive paper was brushed with strong brine, there was no perceptible darkening on exposure to light.

With this silver chloride paper, Talbot first made silhouette pictures of objects laid on it. The image of his camera obscura, however, was not brilliant enough, and his paper was not sensitive enough, to permit making camera pictures. Not until he increased the sensitivity of the paper by treating it with repeated brushings of salt and silver, and not until he had built a camera with large aperture lenses, was he able to get any kind of result. He had to be content with very small images, because the only large aperture lenses available were of short focal length. His wife Constance called these tiny box cameras "mousetraps." Talbot would set an assortment of them on the lawn around Lacock Abbey on a sunny day, and after an hour or so, collect them. In each he found a miniature negative, "such as without stretch of imagination, might be supposed to be the work of some Lilliputian artist."

One of these first paper negatives, barely an inch square, is now preserved in the Science Museum, London. It is signed and dated, "August, 1835." It shows the latticed window of Lacock Abbey.

For the next three years Talbot practically abandoned his photogenic process. He was engrossed in other scientific pursuits. The wave theory of light was then a fairly new concept, and he was conducting a series of experiments to test the theory. This led him to study monochromatic light sources and to perfect limelight. He made important discoveries in the polarization of light, and invented the micropolariscope, which won him the praise of Sir David Brewster. He also was busy with archaeology, and published two books.

Had it not been for the sudden, unexpected announcement of Daguerre's invention, Talbot might never have given his photographic experiments a second thought.

On January 7, 1839, François Arago told fellow members of the Academy of

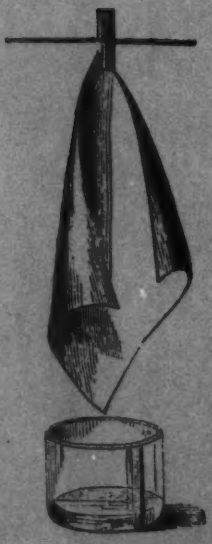
Sciences in Paris that Daguerre had discovered "certain screens on which the optical image leaves a perfect impression." The "screens" were not only more sensitive to light than anything previously known, but Daguerre had found a way to render them insensitive to further light action. "His drawings," Arago said, "when finished, can be exposed to full sunshine without suffering any alteration." He might have been describing Talbot's invention! He went on to say that Daguerre felt that his invention could not be patented, for once the secret was known, anyone could duplicate the results. Arago, therefore, proposed that the French Government should compensate the inventor, and he announced that he would approach the Minister and both Chambers as soon as Daguerre had initiated him into the secret.

Talbot, in his own words, was "placed in a very unusual dilemma (scarcely to be paralleled in the annals of science): for I was threatened with the loss of all my labour, in case M. Daguerre's process proved to be identical with mine, and in case he published it at Paris before I had time to do so in London." To establish priority, he got together a collection of photogenic drawings and sent them to the Royal Institution in London. At the close of the regular Friday evening lecture on January 25, Professor Michael Faraday announced that examples of Daguerre's work could be seen in the library, as well as the invention of Talbot. "No human hand," Faraday said, "had hitherto traced such lines as these drawings display."

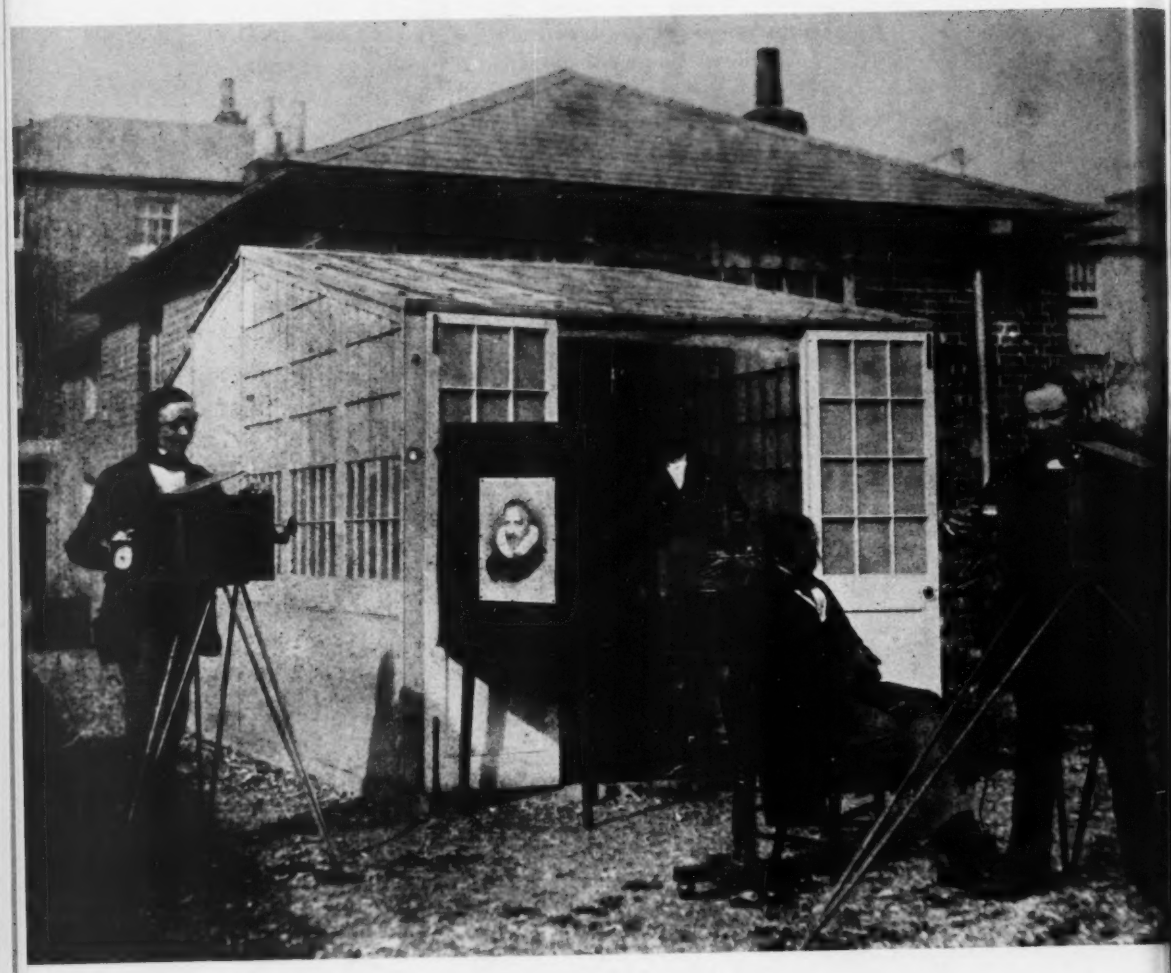
A few days later Talbot wrote to Arago, stating that he was going to file with the Academy a formal claim of priority over Daguerre. He added that he was busy at the moment drawing up an account of his process, which would be read at the Royal Society in London on January 31. He sent identical letters to Jean-Baptiste Biot and Alexander von Humboldt who, with Arago, had seen Daguerre's invention and stood ready to verify his discovery.

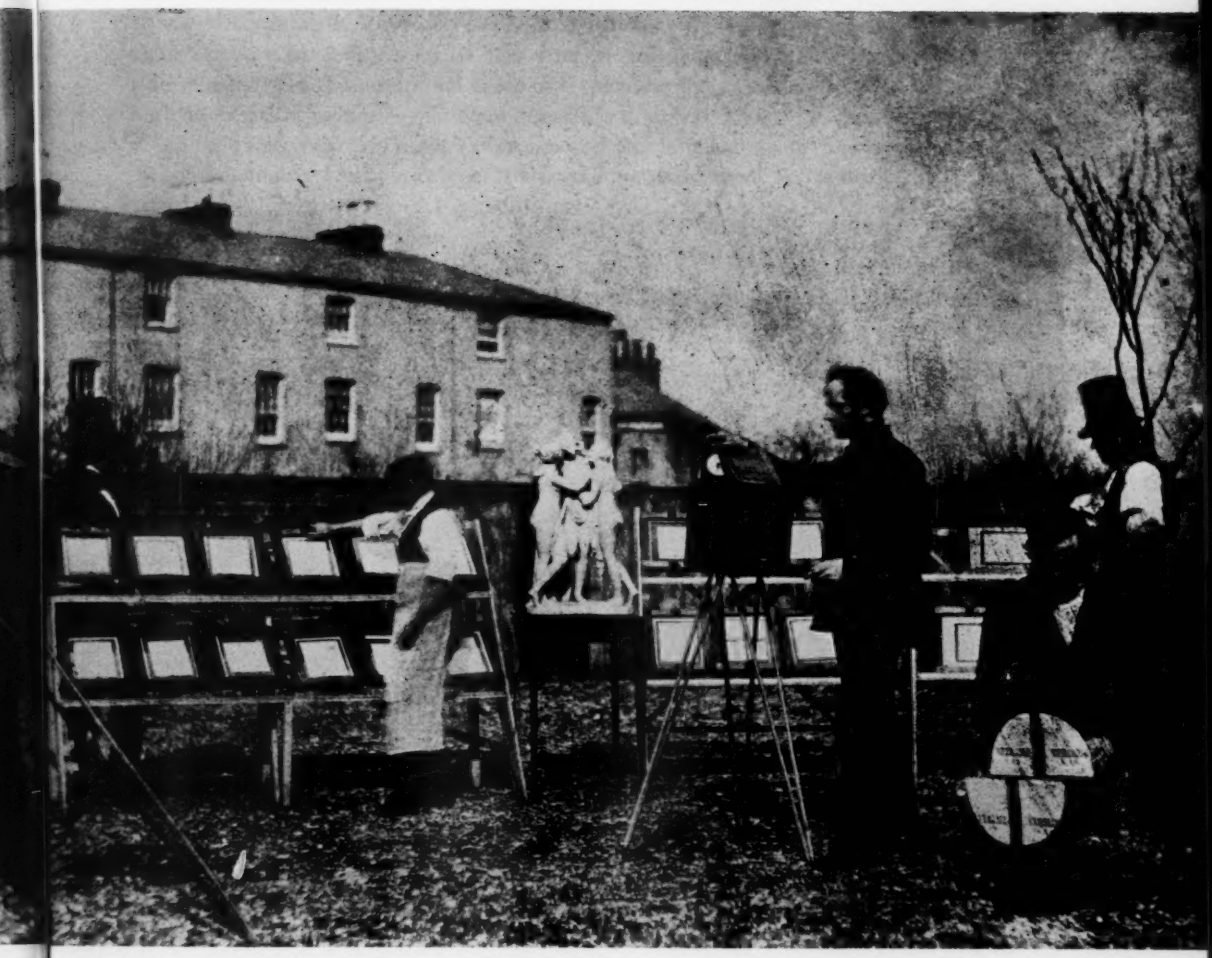
The report was titled, "Some Account of the Art of Photogenic Drawing." Talbot told the circumstances under which he made his discovery, described the results, and explained how it could be used. He mentioned camera pictures, and made quite clear the principle of the negative and positive in his description of how engravings could be copied by placing them face down in contact with the sensitive paper in bright sunlight. ". . . By this method, the lights and shadows are reversed, consequently the effect is wholly altered. But if the picture so obtained is first preserved so as to bear sunshine, it may afterwards itself be employed as an object to be copied; and by means of this second process, the lights and shadows are brought back to their original disposition." He visualized this as a technique for making editions of facsimiles. If positives were rare in 1839, it was because of technical difficulties. Years later Talbot explained, "in the commencement of the photographic art, it was a matter of great difficulty to obtain good positives, because the original or negative pictures, when exposed to the sunshine, speedily grew opaque, and consequently would not yield any positive copies, or only a very few of them."

When this report, as printed in *The Athenaeum*, was received by the French Academy, Biot complained to Talbot that he had not given any specific indication of how his photogenic paper was sensitized, and went on to say that Daguerre was ready to tell the Academy exactly how his light sensitive paper – which Daguerre claimed he had invented years ago but had abandoned – was made. Talbot then sent Biot a letter with complete working details, and submitted a similar report to the Royal Society which was read on the night of February 21.

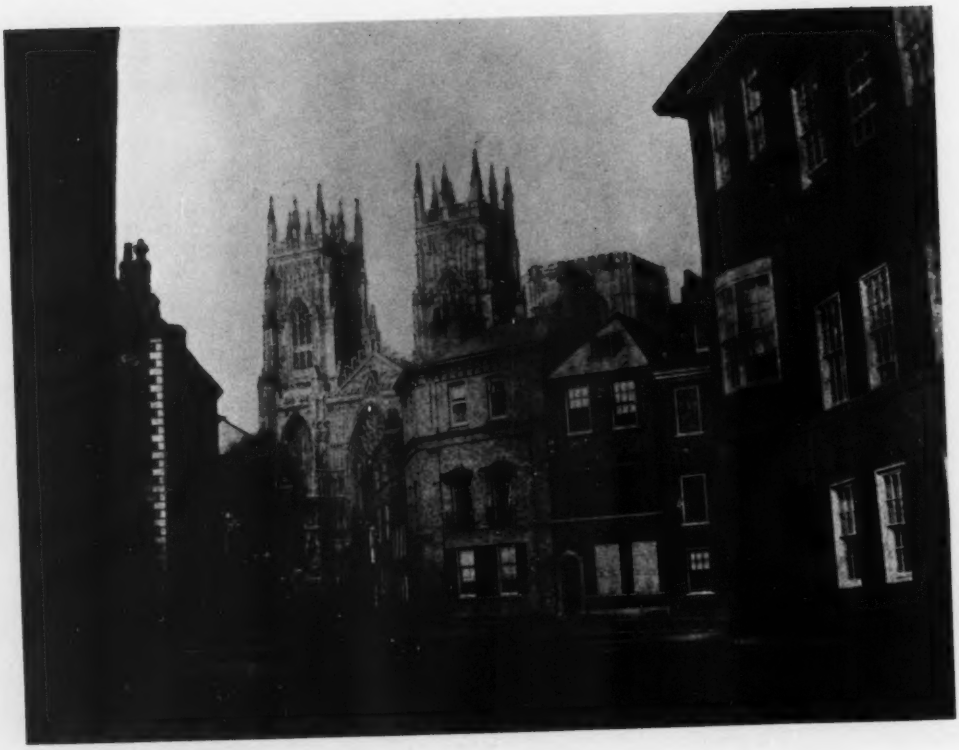


Sensitizing and printing calotypes from **L'Étudiant photographe** by A. Chevalier, Paris, 1876.





Talbot's Calotype Establishment at Reading, England, showing copying of a picture, portraiture, printing in the sun, and photographing a statue. Courtesy Harold White.



FOX TALBOT: A scene in York, courtesy Mr. Harold White.

From these reports, the world learned how to make paper light sensitive by treating it first with salt, and then with silver nitrate. And, what was more important, how to desensitize the prepared paper after exposure by soaking it in strong salt water or potassium iodide solution. The latter chemical reacted with the silver chloride remaining in the unexposed areas to form silver iodide which, when formed with an excess of iodine, is relatively insensible to light.

But only relatively. Although Talbot boasted that his photogenic drawings were "absolutely inalterable by sunshine," they were not permanent. To his dismay they faded on prolonged exposure. His good friend Sir John F. W. Herschel showed him a better way to fix the pictures.

Herschel had just returned to England from four years of intense astronomical work at the Cape of Good Hope while the processes of both Daguerre and Talbot were yet secret. He at once resolved to solve the puzzle. In two days he succeeded. He made paper light sensitive and after exposure dissolved the unexposed silver salts in hyposulphite of soda. Herschel had discovered this chemical (now known as sodium thiosulphate except in the dark room, where "hypo" persists) in 1819, and had noted its ability to dissolve silver salts. Talbot sought his friend's permission to publish this improved fixing process. Herschel gave his consent in a letter in which he used the word "photographed." In a footnote he pointed out that the new word was less clumsy than Talbot's "photogenic."

For the next months the magazines were full of "the new art – photography." From all over the world came claims of priority, many of which Talbot answered. He sent samples to scientific friends at home and abroad. The Italian botanist Antonio Bertolini put the photogenic drawings and letters Talbot sent him in an album, which is now in the Metropolitan Museum of Art, New York. Most of the pictures are negatives made from dried flowers but there is one positive print, measuring 6½ x 7 in., of Lacock Abbey, made from a camera negative.

In August, the British Association for the Advancement of Science met at Birmingham. Talbot exhibited ninety-five of his photogenic drawings there. They were divided in the catalogue into four classes – negatives made by putting objects in contact with the paper, positives from this type of negative, camera pictures both negative and positive, and photomicrographs.

The chief value of Talbot's process was first demonstrated in his book, *The Pencil of Nature,* which he published in 1844.

He illustrated it with actual photographs, printed from negatives made by a new technique to which he gave the name "calotype." He had invented this process in the Fall of 1840. Instead of allowing the sensitive paper to remain exposed to light inside the camera until a visible image was formed, he now found that he could develop the invisible, latent image formed by a very much shorter exposure. To make calotype paper, he first treated good quality writing paper with successive solutions of silver nitrate and potassium iodide. This he could do by daylight. He then made a mixture of silver nitrate, acetic acid, and gallic acid, which he called "gallo-nitrate of silver." Immediately before exposure the iodized paper was brushed with this solution. Exposure was shorter – a building in direct sunlight, for example, required only a minute with a lens working at the equivalent of stop *f*/15. The image was developed with the gallo-nitrate of silver used for sensitizing. It was fixed with hot hypo and washed.

Talbot patented the calotype process in 1841. His action in doing so led to a surprising storm of protest which even reached moral and ethical grounds.

He had already patented three highly ingenious electric motors. In taking out a patent for his photographic invention he was following a well established practice. The patent did not cover the basic invention of photogenic drawing, which, in the interests of science, he had openly published with no restrictions of any kind. For it he had neither asked for, nor been given, any recompense. On the other hand, Daguerre had been handsomely rewarded by the French Government with a pension for life. Although Arago had said that France was proud to present the daguerreotype technique as a free gift to the entire world, Englishmen bitterly discovered that Daguerre had patented the "free gift" in England. A Frenchman resident in London, Antoine Claudet, had the monopoly. There were other patents, including one from America of a reflecting camera. By 1841 photography was a prosperous business, and fortunes were being made. Talbot, who had spent his time, his talents, and a large part of his fortune improving photography, logically took recourse in the machinery set up for the very purpose of protecting inventors and insuring them some reward for their work: the patent laws.

Although Talbot advertised that a license could be obtained for as little as a guinea, and even at no cost if a certain amount of material were purchased from his establishment, there was a growing resentment on the part of photographers to the patent. The reason was not the economics. Photography had already become such an important and vital means of communication that it did not seem fitting that it should be patented like a mechanical device. English photographers looked abroad with envy.

In France the calotype process was flourishing, even though Talbot had patented it there. Louis Désiré Blanquart-Evrard published in 1847 a slight modification of Talbot's technique which he called his own. Even Frenchmen protested at this outright plagiarism. But at his Photographic Printing Establishment in Lille, Blanquart-Evrard turned out calotype prints by the hundred, from negatives taken by various photographers. In quality, the French calotypes, particularly those made by Henry LeSecq, Charles Marville, and Maxime du Camp (who journeyed on the Nile with the writer Gustave Flaubert), exceeded anything made in England. In 1851 a group of French photographers formed the Société Heliographique, and began publishing a journal, *La Lumière*.

Not long afterwards, an informal meeting was held in London to found a similar society. One of the group, Robert Hunt, asked Talbot if some arrangements could not be made about the patent restriction. Talbot explained that he was forced, for economic and business reasons, to maintain his patent rights. He then made a definite proposition: he would give each member of the society, if it was "formed on a very respectable basis," a license, providing that the prints made by the members were not sold except for the benefit of the society. This generous offer apparently did not satisfy the group, who felt that Talbot should relinquish his rights. Feelings grew, until in an almost unprecedented manner two of the most influential semi-official groups in the land brought the combined weight of their authority to bear against Talbot as if he had been a malefactor.

The President of the Royal Society and the President of the Royal Academy wrote him: "We beg to inquire, whether it may not be possible for you, by making some

alterations in the exercise of your patent rights, to obviate most of the difficulties which now appear to hinder the progress of the art in England." Talbot's reply, printed in *The Times* on August 13, 1852, was to give his patent "as a free present to the public"– with one exception, "the application of the invention to taking photographic portraits for sale to the public."

Talbot's gift removed all obstacles for the practice of amateur photography. In 1853 the Photographic Society of London (now the Royal Photographic Society of Great Britain) was formed.

But already the calotype was becoming obsolete along with the daguerreotype. More and more photographers were working a new process: collodion. Glass plates coated with collodion (in which a soluble halide was dissolved) were plunged into silver nitrate. While wet, the plate was developed in iron sulphate. The transparent glass negatives yielded prints richer in detail than could possibly be obtained with paper. Furthermore, the plate when backed with black, produced a direct positive resembling a daguerreotype – called, in America, ambrotype.

The new technique was the invention of Frederick Scott Archer, a compatriot of Talbot's. In 1851 he published full working directions in the magazine *The Chemist*. He exacted nothing, not even the use of his name to describe the process, though his friends tried to put in circulation the word "archerotype."

Professional portraitists not only found this new technique superior, but they saw in it a way to avoid dealing with Talbot. Their attitude was summed up in a caricature showing photography as the infant Hercules strangling two serpents, one labelled "Daguerre's Patent," and the other, "Talbot's Patent." But Talbot, with scientific justification, maintained that Archer's technique was a modification of his calotype process, and he insisted that all who took portraits professionally with collodion plates were guilty of infringing his patent. To protect his business interests – he had set up a portrait studio for his assistant, Nicolaas Hennemann – he felt obligated to prosecute.

Thomas Sims had two galleries in London, where he took portraits on glass plates. He claimed that one day he received a letter from Talbot, praising his collodion work, and requesting an interview. Flattered by the invitation of so eminent a man, Sims hastened to the rendezvous. There, he said, he found waiting for him, not Talbot, but Talbot's attorney, who advised him that he was guilty of infringing his client's technique. A license would cost £325 a year. It was staggering to the twenty-seven-year-old photographer. "I might as well be ruined by paying him," he wrote in his journal. He refused to pay, and his business was closed by court order. The sheriff nailed shut the doors of James Henderson's two London galleries, even though the judge was so unsure of his guilt that he felt the case should be tried. However he forced Henderson to cease business pending trial because "if the defendent was permitted to make these photographic impressions, all others would have a right to do the same."

English patents have a life of fourteen years. Talbot's basic patent was due, therefore, to expire in 1855. He applied for a renewal in July, 1854. The Council of the Photographic Society called a special meeting to discuss what action, if any, should be taken. A letter was read from Martin Laroche, one of the professional portraitists Talbot was in the act of prosecuting. Laroche announced that his lawyer had entered a caveat (a notice to halt an act until those opposed to it are heard)

against Talbot's application for an extension of his patent term. "It is my intention," Laroche said, "to resist such application to the utmost of my power, and in so doing, I trust that I may meet with the well wishes and support of all who are interested in the art of photography." The members were divided in their reaction.

The case of Talbot v. Laroche was brought to trial in December, 1854. The defense attempted to show that Talbot was not the true inventor of photography and was not entitled to the patent in the first place, and that even if he was entitled to patent the calotype technique, the collodion process was separate and distinct. The evidence became increasingly technical, so that the judge was bewildered. "I confess I am afraid I do not understand it," he told the jury in his summing up. But it was clear to the jury that – in the eyes of the Patent Law – Talbot was indeed the inventor of the calotype process and entitled to the patent. The jury felt, however, that the collodion process was sufficiently different so that it could not fall under the patent specification. Laroche was found not guilty.

Talbot was not at all satisfied. He wrote to his wife, "The jury understood little of the subject, but trusted to the judge, and the judge fell into awful mistakes, not being able to comprehend the process which he had never tried. It is impossible we can rest content with the summing up of the judge." But he never appealed.

In the meantime, Talbot devised a technique for photographing on glass which closely resembled the albumen process of the Frenchman Niépce de Saint-Victor. A glass plate was coated with white of egg. Silver salts were formed on this surface by treatment with silver nitrate, protiodide of iron, acetic acid and alcohol. The plate was exposed while wet and developed with iron sulphate. Talbot noted that, like a collodion plate, the result appeared "either negative or positive, according to the light in which they are held." He claimed that he observed this phenomenon before the collodion process was published.

With his new albumen plates, Talbot took in 1851 a photograph by the intense, brief light of an electric spark. He chose as a subject a rapidly revolving wheel, on the rim of which had been fastened a copy of *The Times*. The resulting positive picture was detailed enough so that the headlines could be read. How accurately Talbot predicted the future we are only now beginning to realize. "It is in our power," he wrote, "to obtain pictures of all moving objects, no matter in how rapid motion they may be, providing we have the means of sufficiently illuminating them with a sudden electric flash. . . ."

In 1852 Talbot was working on yet another application of photography; the production of metal plates from photographs which could be printed in a press. He called this "photoglyphic engraving," and in the course of his experiments he added one more basic invention to the formidable list already to his credit.

He was using metal plates coated with gelatin mixed with potassium bichromate. On exposure to light this mixture, soluble when mixed, hardened and became insoluble. If a plate prepared with this mixture was exposed beneath an engraving, or drawing, the gelatin lying beneath each separate line would be protected from the light, but the rest of the plate would be insolublized. When washed with water, the metal would be laid bare exactly where the lines appeared in the original. An etching fluid, poured in the furrows, would eat away the metal, forming grooves which would hold ink. The plate was inked, the surface wiped clean, and then the paper pressed against it. Thus far Talbot's invention did not embody any new

principle. Talbot then thought of breaking up the half-tone areas into minute dots of light and dark by first exposing the plate under a piece of black gauze, folded so the threads crossed at an angle of 45 degrees. He later used a ruled glass screen. This technique, the half-tone screen, became fundamental to almost all graphic arts techniques. The illustrations in a newspaper, examined under a reading glass, will be seen to be made up of a series of black dots. It was Henry Fox Talbot who showed the world how to do this.

This was the last of Talbot's photographic inventions. By the 1860's his chief interest – apart from mathematics and theoretical physics about which he wrote continually – was the deciphering of cuneiform inscription of ancient Assyria. He was never out of touch with photography, however, and was writing an account of his work in that field when he died, on the 17th of September 1877, at Lacock Abbey. The unfinished manuscript was completed by his son Charles and published as an appendix to the second edition of the English translation of Gaston Tissandier's *History of Photography*. Even this account does not give the full story of Talbot's contributions to photography, which only now we are beginning to realize. No single inventor did more.

BEAUMONT NEWHALL

notes on the publication of

THE PENCIL OF NATURE

THE PENCIL OF NATURE was published in six parts, each with a cream-colored paper cover, printed in red and black. The untrimmed size is 9¾ x 12 inches. Each calotype is hand-mounted on a stiff card within a rectangle hand-ruled in brown ink; the plate number is lettered within the rectangle, below the lower right-hand corner of the calotype. The 80 text pages are not numbered: they are distributed as follows: *Part I*, pp. [1-38], plates I-V; *Part II*, pp. [39-52], plates VI-XII; *Part III*, pp. [53-58], plates XIII-XV; *Part IV*, pp. [59-64], plates XVI-XVIII; *Part V*, pp. [65-74], plates XIX-XXI; *Part VI*, pp. [75-80], plates XXII-XXIV.

Unbound sets of the publication bear the cost on the cover of each number. The first two were the most expensive, at 12 shillings and 21 shillings respectively; the remaining issues cost 7 shillings 6 pence each, making a total of £3.30.

Publication was begun shortly before June, 1844, to judge from the date of a prospectus announcing that Part I was "just published." The *Art Union* reviewed Parts II, III and IV in its issues dated March, September, and October of 1845: Parts V and VI were not reviewed.

The criticism was favorable: "The first of the examples . . . is a part of Queen's College, Oxford. The time is morning; and the view is taken from the other side of High-street, looking north. The stone of which this college is built, is extremely soft, and it presents a very broken and weatherworn appearance; but the representation of all this is the most perfect that can be conceived; the minutest detail is given with a softness that cannot be imitated by any artistic manipulation."

A detailed description of the printing of the calotypes in *The Pencil of Nature* was given by Talbot's assistant, Thomas Augustine Malone, under the initial "M." in *The Liverpool and Manchester Photographic Journal*, new series, I (1857), 270. Sheets of Hollingsworth's Turkey Mill paper were bathed for two minutes in a solution of common salt – one or two ounces per gallon. The surface of the paper was then swabbed with a cloth pad and allowed to dry. The paper was then sensitized with a solution described as "ammonio-nitrate of silver." This was produced by adding caustic ammonia solution, the strength of which is not specified, to silver nitrate until the brown precipitate first formed was re-dissolved; then dilute nitric acid. Without the acid an unsatisfactory "cold, slate-coloured hue" was obtained; with just the proper amount of acid the result was "a good, rich mulberry tint."

The printing was done in sunlight. Prints which were too dark by over-printing were reduced by immersion in potassium iodide and exposed once again to light, which exerted a bleaching action. Malone noted that by this technique the contrast was increased. The prints were fixed in a hot, one-to-ten solution of "hyposulphite of soda" (i.e. sodium thiosulphate). It was remarked that the best tone was obtained when a slight amount of sodium thiosulphate remained in the paper: "Experiments, requiring time, are in progress with a view to ascertaining how long hyposulphite of soda can remain exposed to the air without oxidation and consequent destruction." The fact that the prints in most copies of *The Pencil of Nature* are badly bleached is quite likely due to the presence of traces of sodium thiosulphate which were not washed out.

We have located 24 copies of *The Pencil of Nature*, in the following collections: New York Public Library (2); Metropolitan Museum of Art, New York; Richard Wormser, Bethel, Conn.; Smithsonian Institution, Washington, D. C.; The Library of Congress, Washington, D. C.; George Eastman House, Rochester, N. Y. (2); J. S. Mertle, Oshkosh, Wisc.; Philip Hofer, Cambridge, Mass.; British Museum, London; Victoria and Albert Museum, London (3); Royal Photographic Society, London (2); Helmut and Alison Gernsheim, London; Harold White, Bromley, Kent; Kodak Museum, Harrow, Middlesex; Glasgow University, Glasgow; University Library, Edinburgh; Estate of Miss M. T. Talbot, Lacock Abbey, Wiltshire; Graphische Lehr-und Versuchsanstalt, Vienna. Complete copies, containing all six parts are extremely rare; there are only three in the United States: two bound copies (New York Public Library, The Library of Congress) and one in original parts (George Eastman House).

The Pencil of Nature,

BY

H. FOX TALBOT, Esq., F.R.S.
&c. &c. &c.

JUVAT IRE JUGIS QUA NULLA PRIORUM
CASTALIAM MOLLI DEVERTITUR ORBITA CLIVO.

LONDON:
LONGMAN, BROWN, GREEN, & LONGMANS,
PATERNOSTER ROW.

1844.

MOTTO ON TITLE PAGE OF THE PENCIL OF NATURE

Juvat ire jugis qua nulla priorum/castallam molli devertitur orbita clivo.

These lines were identified as taken from Vergil, Georgica III, 293 by Kurt von Fritz of Columbia University (letter to B. N. dated Nov. 19, 1947) who translated them as follows:

"It is a joyous thing to roam over the mountain ridges where no track of earlier comers leads down over a gentle slope to Castalia."

Notice to the Reader.

The plates of the present work are impressed by the agency of Light alone, without any aid whatever from the artist's pencil. They are the sun-pictures themselves, and not, as some persons have imagined, engravings in imitation.

Introductory Remarks.

THE LITTLE WORK now presented to the Public is the first attempt to publish a series of plates or pictures wholly executed by the new art of Photogenic Drawing, without any aid whatever from the artist's pencil.

The term "Photography" is now so well known, that an explanation of it is perhaps superfluous; yet, as some persons may still be unacquainted with the art, even by name, its discovery being still of very recent date, a few words may be looked for of general explanation.

It may suffice, then, to say, that the plates of this work have been obtained by the mere action of Light upon sensitive paper. They have been formed or depicted by optical and chemical means alone, and without the aid of any one acquainted with the art of drawing. It is needless, therefore, to say that they differ in all respects, and as widely as possible, in their origin, from plates of the ordinary kind, which owe their existence to the united skill of the Artist and the Engraver.

They are impressed by Nature's hand; and what they want as yet of delicacy and finish of execution arises chiefly from our want of sufficient knowledge of her laws. When we have learnt more, by experience, respecting the formation of such pictures, they will doubtless be brought much nearer to perfection; and though we may not be able to conjecture with any certainty what rank they may hereafter attain to as pictorial productions, they will surely find their own sphere of utility, both for completeness of detail and correctness of perspective.

The Author of the present work having been so fortunate as to discover, about ten years ago, the principles and practice of Photogenic Drawing, is desirous that the first specimen of an Art, likely in all probability to be much employed in future, should be published in the country where it was first discovered. And he makes no doubt that his countrymen will deem such an intention sufficiently laudable to induce them to excuse the imperfections necessarily incident to a first attempt to exhibit an Art of so great singularity, which employs processes entirely new, and having no analogy to anything in use before. That such imperfections will occur in a first essay, must indeed be expected. At present the Art can hardly be said to have advanced beyond its infancy – at any rate, it is yet in a very early stage – and its practice is often impeded by doubts and difficulties, which, with increasing knowledge, will diminish and disappear. Its progress will be more rapid when more minds are devoted to its improvement, and when more of skillful manual assistance is employed in the manipulation of its delicate processes; the paucity of which skilled assistance at the present moment the Author finds one of the chief difficulties in his way.

Brief Historical Sketch

of the

Invention of the Art.

IT MAY BE PROPER to preface these specimens of a new Art by a brief account of the circumstances which preceded and led to the discovery of it. And these were nearly as follows.

One of the first days of the month of October 1833, I was amusing myself on the lovely shores of the Lake of Como, in Italy, taking sketches with Wollaston's Camera Lucida, or rather I should say, attempting to take them: but with the smallest possible amount of success. For when the eye was removed from the prism – in which all looked beautiful – I found that the faithless pencil had only left traces on the paper melancholy to behold.

After various fruitless attempts, I laid aside the instrument and came to the conclusion, that its use required a previous knowledge of drawing, which unfortunately I did not possess.

I then thought of trying again a method which I had tried many years before. This method was, to take a Camera Obscura, and to throw the image of the objects on a piece of transparent tracing paper laid on a pane of glass in the focus of the instrument. On this paper the objects are distinctly seen, and can be traced on it with a pencil with some degree of accuracy, though not without much time and trouble.

I had tried this simple method during former visits to Italy in 1823 and 1824, but found it in practice somewhat difficult to manage, because the pressure of the hand and pencil upon the paper tends to shake and displace the instrument (insecurely fixed, in all probability, while taking a hasty sketch by a roadside, or out of an inn window); and if the instrument is once deranged, it is most difficult to get it back again, so as to point truly in its former direction.

Besides which, there is another objection, namely, that it baffles the skill and patience of the amateur to trace all the minute details visible on the paper; so that, in fact, he carries away with him little beyond a mere souvenir of the scene – which, however, certainly has its value when looked back to, in long after years.

Such, then, was the method which I proposed to try again, and to endeavor, as before, to trace with my pencil the outlines of the scenery depicted on the paper. And this led me to reflect on the inimitable beauty of the pictures of nature's paint-

ing which the glass lens of the Camera throws upon the paper in its focus – fairy pictures, creations of a moment, and destined as rapidly to fade away.

It was during these thoughts that the idea occurred to me . . . how charming it would be if it were possible to cause these natural images to imprint themselves durably, and remain fixed upon the paper!

And why should it not be possible? I asked myself.

The picture, divested of the ideas which accompany it, and considered only in its ultimate nature, is but a succession or variety of stronger lights thrown upon one part of the paper, and of deeper shadows on another. Now Light, where it exists, can exert an action, and, in certain circumstances, does exert one sufficient to cause changes in material bodies. Suppose, then, such an action could be exerted on the paper; and suppose the paper could be visibly changed by it. In that case surely some effect must result having a general resemblance to the cause which produced it: so that the variegated scene of light and shade might leave its image or impression behind, stronger or weaker on different parts of the paper according to the strength or weakness of the light which had acted there.

Such, then, was the method which I proposed to try again, and to endeavor, as before amid floating philosophic visions, I know not, though I rather think it must have done so, because on this occasion it struck me so forcibly. I was then a wanderer in classic Italy, and, of course, unable to commence an inquiry of so much difficulty: but, lest the thought should again escape me between that time and my return to England, I made a careful note of it in writing, and also of such experiments as I thought would be most likely to realize it, if it were possible.

And since, according to chemical writers, the nitrate of silver is a substance peculiarly sensitive to the action of light, I resolved to make a trial of it, in the first instance, whenever occasion permitted on my return to England.

But although I knew the fact from chemical books, that nitrate of silver was changed or decomposed by Light, still I had never seen the experiment tried, and therefore I had no idea whether the action was a rapid or a slow one; a point, however, of the utmost importance, since, if it were a slow one, my theory might prove but a philosophic dream.

Such were, as nearly as I can now remember, the reflections which led me to the invention of this theory, and which first impelled me to explore a path so deeply hidden among nature's secrets. And the numerous researches which were afterwards made – whatever success may be thought to have attended them – cannot, I think, admit of a comparison with the value of the first and original idea.

In January 1834, I returned to England from my continental tour, and soon afterwards I determined to put my theories and speculations to the test of experiment, and see whether they had any real foundation.

Accordingly, I began by procuring a solution of nitrate of silver, and with a brush spread some of it upon a sheet of paper, which was afterwards dried. When this paper was exposed to the sunshine, I was disappointed to find that the effect was very slowly produced in comparison with what I had anticipated.

I then tried the chloride of silver, freshly precipitated and spread upon paper while moist. This was found no better than the other, turning slowly to a darkish violet colour when exposed to the sun.

Instead of taking the chloride already formed, and spreading it upon paper, I

then proceeded in the following way. The paper was first washed with a strong solution of salt, and when this was dry, it was washed again with nitrate of silver. Of course, chloride of silver was thus formed in the paper, but the result of this experiment was almost the same as before, the chloride not being apparently rendered more sensitive by being formed in this way.

Similar experiments were repeated at various times, in hopes of a better result, frequently changing the proportions employed, and sometimes using the nitrate of silver before the salt, &c. &c.

In the course of these experiments, which were often rapidly performed, it sometimes happened that the brush did not pass over the whole of the paper, and of course this produced irregularity in the results. On some occasions certain portions of the paper were observed to blacken in the sunshine much more rapidly than the rest. These more sensitive portions were generally situated near the edges or confines of the part that had been washed over with the brush.

After much consideration as to the cause of this appearance, I conjectured that these bordering portions might have absorbed a lesser quantity of salt, and that, for some reason or other, this had made them more sensitive to the light. This idea was easily put to the test of experiment. A sheet of paper was moistened with a much weaker solution of salt than usual, and when dry, it was washed with nitrate of silver. This paper, when exposed to the sunshine, immediately manifested a far greater degree of sensitiveness than I had witnessed before, the whole of its surface turning black uniformly and rapidly: establishing at once and beyond all question the important fact, that a lesser quantity of salt produced a greater effect. And, as this circumstance was unexpected, it afforded a simple explanation of the cause why previous inquirers had missed this important result, in their experiments on chloride of silver, namely, because they had always operated with wrong proportions of salt and silver, using plenty of salt in order to produce a perfect chloride, whereas what was required (it was now manifest) was, to have a deficiency of salt, in order to produce an imperfect chloride, or (perhaps it should be called) a *subchloride* of silver.

So far was a free use or abundance of salt from promoting the action of light on the paper, that on the contrary it greatly weakened and almost destroyed it: so much so, that a bath of salt water was used subsequently as a fixing process to prevent the further action of light upon sensitive paper.

This process, of the formation of a subchloride by the use of a very weak solution of salt, having been discovered in the spring of 1834, no difficulty was found in obtaining distinct and very pleasing images of such things as leaves, lace, and other flat objects of complicated forms and outlines, by exposing them to the light of the sun.

The paper being well dried, the leaves, &c. were spread upon it, and covered with a glass pressed down tightly, and then placed in the sunshine; and when the paper grew dark, the whole was carried into the shade, and the objects being removed from off the paper, were found to have left their images very perfectly and beautifully impressed or delineated upon it.

But when the sensitive paper was placed in the focus of a Camera Obscura and directed to any object, as a building for instance, during a moderate space of time, as an hour or two, the effect produced upon the paper was not strong enough to

exhibit such a satisfactory picture of the building as had been hoped for. The outline of the roof and of the chimneys, &c. against the sky was marked enough; but the details of the architecture were feeble, and the parts in shade were left either blank or nearly so. The sensitiveness of the paper to light, considerable as it seemed in some respects, was therefore, as yet, evidently insufficient for the purpose of obtaining pictures with the Camera Obscura; and the course of experiments had to be again renewed in hopes of attaining to some more important result.

The next interval of sufficient leisure which I found for the prosecution of this inquiry, was during a residence at Geneva in the autumn of 1834. The experiments of the previous spring were then repeated and varied in many ways; and having been struck with a remark of Sir H. Davy's which I had casually met with – that the *iodide* of silver was more sensitive to light than the *chloride,* I resolved to make trial of the iodide. Great was my surprise on making the experiment to find just the contrary of the fact alleged, and to see that the iodide was not only less sensitive than the chloride, but that it was not sensitive at all to light; indeed that it was absolutely insensible to the strongest sunshine: retaining its original tint (a pale straw colour) for any length of time unaltered in the sun. This fact showed me how little dependance was to be placed on the statements of chemical writers in regard to this particular subject, and how necessary it was to trust to nothing but actual experiment: for although there could be no doubt that Davy had observed what he described under certain circumstances – yet it was clear also, that what he had observed was some exception to the rule, and not the rule itself. In fact, further inquiry showed me that Davy must have observed a sort of subiodide in which the iodine was deficient as compared with the silver: for, as in the case of the chloride and subchloride the former is much less sensitive, so between the iodide and subiodide there is a similar contrast, but it is a much more marked and complete one.

However, the fact now discovered, proved of immediate utility; for, the iodide of silver being found to be insensible to light, and the chloride being easily converted into the iodide by immersion in iodide of potassium, it followed that a picture made with the chloride could be *fixed* by dipping it into a bath of the alkaline iodide.

This process of fixation was a simple one, and it was sometimes very successful. The disadvantages to which it was liable did not manifest themselves until a later period, and arose from a new and unexpected cause, namely, that when a picture is so treated, although it is permanently secured against the *darkening* effect of the solar rays, yet it is exposed to a contrary or *whitening* effect from them; so that after the lapse of some days the dark parts of the picture begin to fade, and gradually the whole picture becomes obliterated, and is reduced to the appearance of a uniform pale yellow sheet of paper. A good many pictures, no doubt, escape this fate, but as they all seem liable to it, the fixing process by iodine must be considered as not sufficiently certain to be retained in use as a photographic process, except when employed with several careful precautions which it would be too long to speak of in this place.

During the brilliant summer of 1835 in England I made new attempts to obtain pictures of buildings with the Camera Obscura; and having devised a process which gave additional sensibility to the paper, viz. by giving it repeated alternate washes of salt and silver, and using it in a moist state, I succeeded in reducing the time

necessary for obtaining an image with the Camera Obscura on a bright day to ten minutes. But these pictures, though very pretty, were very small, being quite miniatures. Some were obtained of a larger size, but they required much patience, nor did they seem so perfect as the smaller ones, for it was difficult to keep the instrument steady for a great length of time pointing at the same object, and the paper being used moist was often acted on irregularly.

During the three following years not much was added to previous knowledge. Want of sufficient leisure for experiments was a great obstacle and hindrance, and I almost resolved to publish some account of the Art in the imperfect state in which it then was.

However curious the results which I had met with, yet I felt convinced that much more important things must remain behind, and that the clue was still wanting to this labyrinth of facts. But as there seemed no immediate prospect of further success, I thought of drawing up a short account of what had been done, and presenting it to the Royal Society.

However, at the close of the year 1838, I discovered a remarkable fact of quite a new kind. Having spread a piece of silver leaf on a pane of glass, and thrown a particle of iodine upon it, I observed that coloured rings formed themselves around the central particle, especially if the glass was slightly warmed. The coloured rings I had no difficulty in attributing to the formation of infinitely thin layers or strata of iodide of silver; but a most unexpected phenomenon occurred when the silver plate was brought into the light by placing it near a window. For then the coloured rings shortly began to change their colours, and assumed other and quite unusual tints, such as are never seen in the *"colours of thin plates."* For instance, the part of the silver plate which at first shone with a pale yellow colour, was changed to a dark olive green when brought into the daylight. This change was not very rapid: it was much less rapid than the changes of some of the sensitive papers which I had been in the habit of employing, and therefore, after having admired the beauty of this new phenomenon, I laid the specimens by, for a time, to see whether they would preserve the same appearance, or would undergo any further alteration.

Such was the progress which I had made in this inquiry at the close of the year 1838, when an event occurred in the scientific world, which in some degree frustrated the hope with which I had pursued, during nearly five years, this long and complicated, but interesting series of experiments – the hope, namely, of being the first to announce to the world the existence of the New Art – which has been since named Photography.

I allude, of course, to the publication in the month of January 1839, of the great discovery of M. Daguerre, of the photographic process which he has called the Daguerreotype. I need not speak of the sensation created in all parts of the world by the first announcement of this splendid discovery, or rather, of the fact of its having been made, (for the actual method made use of was kept secret for many months longer). This great and sudden celebrity was due to two causes: first, to the beauty of the discovery itself: secondly, to the zeal and enthusiasm of Arago, whose eloquence, animated by private friendship, delighted in extolling the inventor of this new art, sometimes to the assembled science of the French Academy, at other times to the less scientific judgment, but not less eager patriotism, of the Chamber of Deputies.

But, having brought this brief notice of the early days of the Photographic Art to the important epoch of the announcement of the Daguerreotype, I shall defer the subsequent history of the Art to a future number of this work.

Some time previously to the period of which I have now been speaking, I met with an account of some researches on the action of Light, by Wedgwood and Sir H. Davy, which, until then, I had never heard of. Their short memoir on this subject was published in 1802 in the first volume of the Journal of the Royal Institution. It is curious and interesting, and certainly establishes their claim as the first inventors of the Photographic Art, though the actual progress they made in it was small. They succeeded, indeed, in obtaining impressions from solar light of flat objects laid upon a sheet of prepared paper, but they say that they found it impossible to fix or preserve those pictures: all their numerous attempts to do so having failed.

And with respect to the principal branch of the Art, viz. the taking pictures of distant objects with a Camera Obscura, they attempted to do so, but obtained no result at all, however long the experiment lasted. While therefore due praise should be awarded to them for making the attempt, they have no claim to the actual discovery of any process by which such a picture can really be obtained.

It is remarkable that the failure in this respect appeared so complete, that the subject was soon after abandoned both by themselves and others, and as far as we can find, it was never resumed again. The thing fell into entire oblivion for more than thirty years: and therefore, though the Daguerreotype was not so entirely new a conception as M. Daguerre and the French Institute imagined, and though my own labours had been still more directly anticipated by Wedgwood, yet the improvements were so great in all respects, that I think the year 1839 may fairly be considered as the real date of the birth of the Photographic Art, that is to say, its first public disclosure to the world.

There is a point to which I wish to advert, which respects the execution of the following specimens. As far as respects the design, the copies are almost facsimiles of each other, but there is some variety in the tint which they present. This arises from a twofold cause. In the first place, each picture is separately formed by the light of the sun, and in our climate the strength of the sun's rays is exceedingly variable even in serene weather. When clouds intervene, a longer time is of course allowed for the impression of a picture, but it is not possible to reduce this to a matter of strict and accurate calculation.

The other cause is the variable quality of the paper employed, even when furnished by the same manufacturers – some differences in the fabrication and in the *sizing* of the paper, known only to themselves, and perhaps secrets of the trade, have a considerable influence on the tone of colour which the picture ultimately assumes.

These tints, however, might undoubtedly be brought nearer to uniformity, if any great advantage appeared likely to result: but, several persons of taste having been consulted on the point, viz. which tint on the whole deserved a preference, it was found that their opinions offered nothing approaching to unanimity, and therefore, as the process presents us spontaneously with a variety of shades of colour, it was thought best to admit whichever appeared pleasing to the eye, without aiming at an uniformity which is hardly attainable. And with these brief observations I commend the pictures to the indulgence of the Gentle Reader.

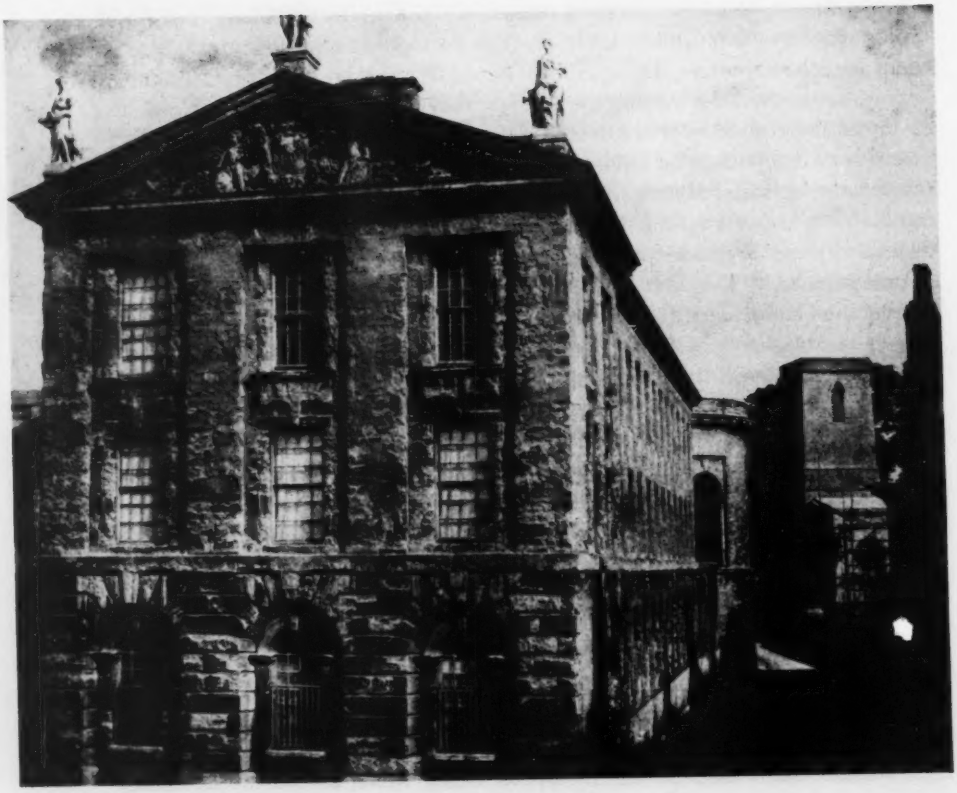


PLATE I

PART OF QUEEN'S COLLEGE, OXFORD

This building presents on its surface the most evident marks of the injuries of time and weather, in the abraded state of the stone, which probably was of a bad quality originally.

The view is taken from the other side of the High Street – looking North. The time is morning.

In the distance is seen at the end of a narrow street the Church of St. Peter's in the East, said to be the most ancient church in Oxford, and built during the Saxon era. This street, shortly after passing the church, turns to the left, and leads to New College.

PLATE II

VIEW OF THE BOULEVARDS AT PARIS

This view was taken from one of the upper windows of the Hotel de Douvres, situated at the corner of the Rue de la Paix.

The spectator is looking to the North-east. The time is the afternoon. The sun is just quitting the range of buildings adorned with columns: its facade is already in the shade, but a single shutter standing open projects far enough forward to catch a gleam of sunshine. The weather is hot and dusty, and they have just been watering the road, which has produced two broad bands of shade upon it, which unite in the foreground, because, the road being partially under repair (as is seen from the two wheelbarrows, &c. &c.), the watering machines have been compelled to cross to the other side.

By the roadside a row of *cittadines* and cabriolets are waiting, and a single carriage stands in the distance a long way to the right.

A whole forest of chimneys borders the horizon: for, the instrument chronicles whatever it sees, and certainly would delineate a chimney-pot or a chimney-sweeper with the same impartiality as it would the Apollo of Belvedere.

The view is taken from a considerable height, as appears easily by observing the house on the right hand; the eye being necessarily on a level with that part of the building on which the horizontal lines or courses of stone appear parallel to the margin of the picture.

PLATE III

ARTICLES OF CHINA

From the specimen here given it is sufficiently manifest, that the whole cabinet of a Virtuoso and collector of old China might be depicted on paper in little more time than it would take him to make a written inventory describing it in the usual way. The more strange and fantastic the forms of his old teapots, the more advantage in

having their pictures given instead of their descriptions.

And should a thief afterwards purloin the treasures – if the mute testimony of the picture were to be produced against him in court – it would certainly be evidence of a novel kind; but what the judge and jury might say to it, is a matter which I leave to the speculation of those who possess legal acumen.

The articles represented on this plate are numerous: but, however numerous the objects – however complicated the arrangement – the Camera depicts them all at once. It may be said to make a picture of whatever *it sees*. The object glass is the *eye* of the instrument – the sensitive paper may be compared to the *retina*. And, the eye should not have too large a *pupil:* that is to say, the glass should be diminished by placing a screen or diaphragm before it, having a small circular hole, through which alone the rays of light may pass. When the eye of the instrument is made to look at the objects through this contracted aperture, the resulting image is much more sharp and correct. But it takes a longer time to impress itself upon the paper, because, in proportion as the aperture is contracted, fewer rays enter the instrument from the surrounding objects, and consequently fewer fall upon each part of the paper.

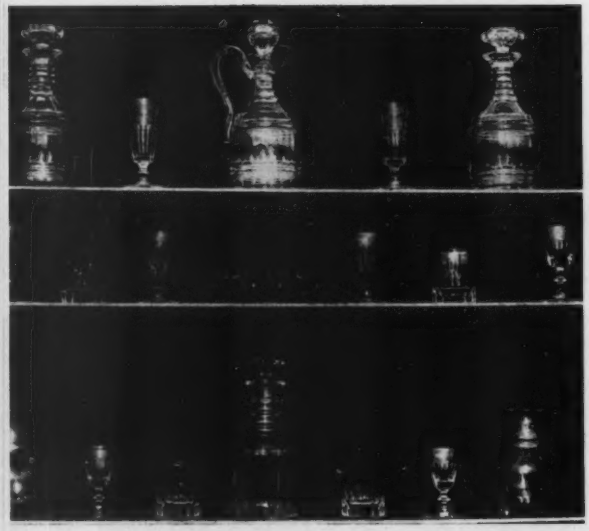


PLATE IV

ARTICLES OF GLASS

The photogenic images of glass articles impress the sensitive paper with a very peculiar touch, which is quite different from that of the China in Plate III. And it may be remarked that white china and glass do not succeed well when represented together, because the picture of the china, from its superior brightness, is completed before that of the glass is well begun. But coloured china may be introduced along with glass in the same picture, provided the colour is not a pure blue: since blue objects affect the sensitive paper almost as rapidly as white ones do. On the contrary, green rays act very feebly – an inconvenient circumstance, whenever green trees are to be represented in the same picture with buildings of a light hue, or with any other light coloured objects.

PLATE V

BUST OF PATROCLUS

Statues, busts, and other specimens of sculpture, are generally well represented by the Photographic Art; and also very rapidly, in consequence of their whiteness.

These delineations are susceptible of an almost unlimited variety: since in the first place, a statue may be placed in any position with re-

gard to the sun, either directly opposite to it, or at any angle: the directness or obliquity of the illumination causing of course an immense difference in the effect. And when a choice has been made of the direction in which the sun's rays shall fall, the statue may be then turned round on its pedestal, which produces a second set of variations no less considerable than the first. And when to this is added the change of size which is produced in the image by bringing the Camera Obscura nearer to the statue or removing it further off, it becomes evident how very great a number of different effects may be obtained from a single specimen of sculpture.

With regard to many statues, however, a better effect is obtained by delineating them in cloudy weather than in sunshine. For, the sunshine causes such strong shadows as sometimes to confuse the subject. To prevent this, it is a good plan to hold a white cloth on one side of the statue at a little distance to reflect back the sun's rays and cause a faint illumination of the parts which would otherwise be lost in shadow.

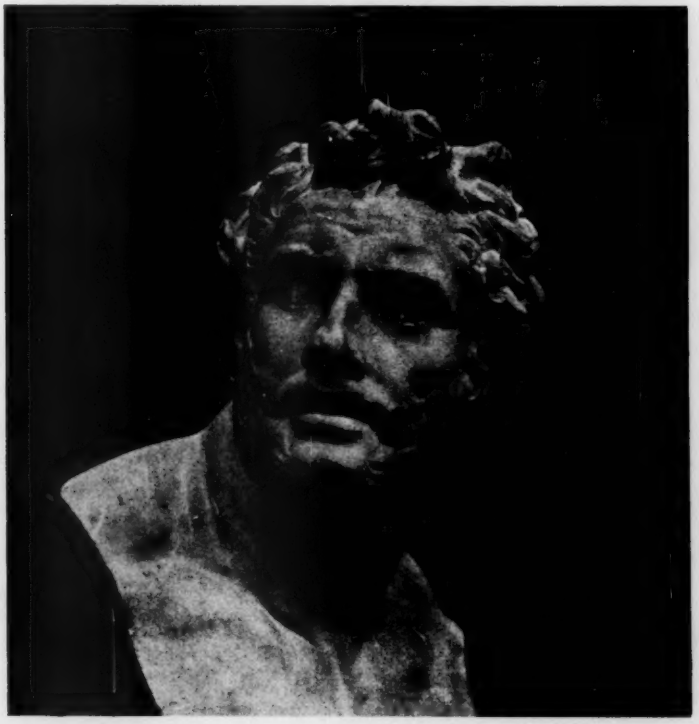


PLATE VI

THE OPEN DOOR

The chief object of the present work is to place on record some of the early beginnings of a new art, before the period, which we trust is approaching, of its being brought to maturity by the aid of British talent.

This is one of the trifling efforts of its infancy, which some partial friends have been kind enough to commend.

We have sufficient authority in the Dutch school of art, for taking as subjects of representation scenes of daily and familiar occurrence. A painter's eye will often be arrested where ordinary people see nothing remarkable. A casual gleam of sunshine, or a shadow thrown across his path, a time-withered oak, or a moss-covered stone may awaken a train of thoughts and feelings, and picturesque imaginings.

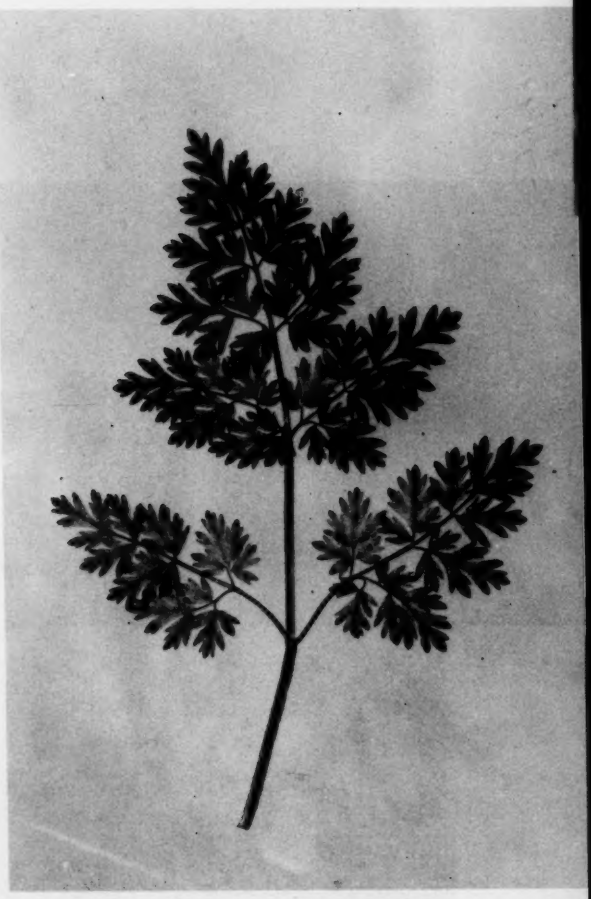


PLATE VII
LEAF OF A PLANT

Hitherto we have presented to the reader the representations of distant objects, obtained by the use of a Camera Obscura. But the present plate represents an object of its natural size. And this is effected by quite a different and much simpler process, as follows.

A leaf of a plant, or any similar object which is thin and delicate, is laid flat upon a sheet of prepared paper which is moderately sensitive. It is then covered with a glass, which is pressed down tight upon it by means of screws.

This done, it is placed in the sunshine for a few minutes, until the exposed parts of the paper have turned dark brown or nearly black. It is then removed into a shady place, and when the leaf is taken up, it is found to have left its impression or picture on the paper. This image is of a pale brown tint if the leaf is semi-transparent, or it is quite white if the leaf is opaque.

The leaves of plants thus represented in white upon a dark background, make very pleasing pictures, and I shall probably introduce a few specimens of them in the sequel of this work: but the present plate shews one pictured in the contrary manner, viz. dark upon a white ground: or, speaking in the language of photography, it is a *positive* and not a *negative* image of it. The change is accomplished by simply repeating the first process. For, that process, as above described, gives a white image on a darkened sheet of paper: this sheet is then taken and washed with a fixing liquid to destroy the sensibility of the paper and fix the image on it.

This done, the paper is dried, and then it is laid upon a second sheet of sensitive paper, being pressed into close contact with it, and placed in the sunshine: this second process is evidently only a repetition of the first. When finished, the second paper is found to have received an image of a contrary kind to the first; the ground being white, and the image upon it dark.

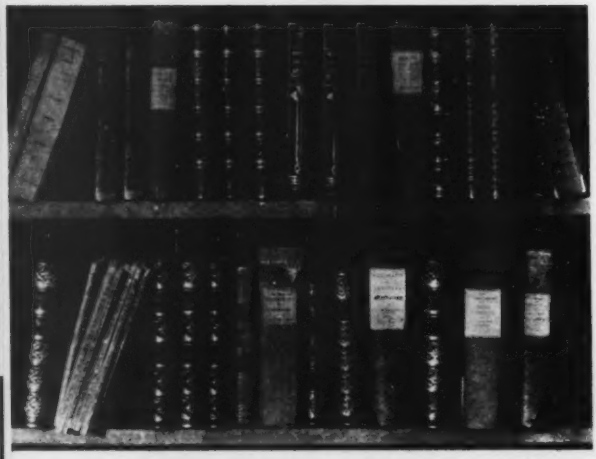


PLATE VIII

A SCENE IN A LIBRARY

Among the many novel ideas which the discovery of Photography has suggested, is the following rather curious experiment or speculation. I have never tried it, indeed, nor am I aware that any one else has either tried or proposed it, yet I think it is one which, if properly managed, must inevitably succeed.

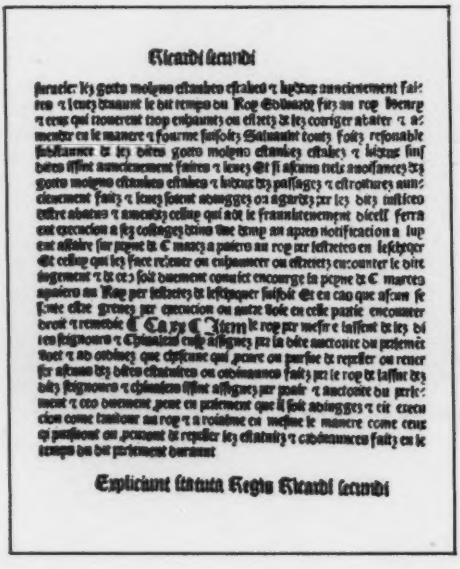
When a ray of solar light is refracted by a prism and thrown upon a screen, it forms there the very beautiful coloured band known by the name of the solar spectrum.

Experimenters have found that if this spectrum is thrown upon a sheet of sensitive paper, the violet end of it produces the principal effect: and, what is truly remarkable, a similar effect is produced by certain *invisible rays* which lie beyond the violet, and beyond the limits of the spectrum, and whose existence is only revealed to us by this action which they exert.

Now, I would propose to separate these invisible rays from the rest, by suffering them to pass into an adjoining apartment through an aperture in a wall or screen of partition. This apartment would thus become filled (we must not call it *illuminated)* with invisible rays, which might be scattered in all directions by a convex lens placed behind the aperture. If there were a number of persons in the room, no one would see the other: and yet nevertheless if a *camera* were so placed as to point in the direction in which any one were standing, it would take his portrait, and reveal his actions.

For, to use a metaphor we have already employed, the eye of the camera would see plainly where the human eye would find nothing but darkness.

Alas! that this speculation is somewhat too refined to be introduced with effect into a modern novel or romance; for what a *dénouement* we should have, if we could suppose the secrets of the darkened chamber to be revealed by the testimony of the imprinted paper.



Ricardi Secundi

parcele: les gotes molyno eſtanbes eſtables ⁊ lieux nauciennement faiz
res ⁊ iceux trauant le dit temps ou Roy Salomon fuz au roy Decare
⁊ ceux qui trouerent trop enhauntz ou eſtretz & les corriger abatre ⁊ a-
mender en le maniere ⁊ fourme ſuſdits Saluaunt toutz foitz reſonable
ſubſtaunce & les dites gotes molyno eſtanbes eſtables ⁊ lieux ſuſ
dites iſſint nauciennement faires ⁊ leuez Et ſi aſcuns tielx nuoſſances les
gotes molyno eſtanbes eſtables ⁊ lieux les paſſages ⁊ eſtroitures aun-
ciennement faitz ⁊ leuez furent atouggez ou agardez par les dits iuſtices
eſtre abatus ⁊ amendez celuy qui dit le franktenement deceſſ ferra
ent execucion a les coſtages dune the temp an apres notification a lup
ent affaire ſur peyne & C marcz a paiere au roy per leſtreto en leſchequer
Et celuy qui les face refeuer ou enhaunceer ou eſtretz encounter le dite
iugement ⁊ & ce ſoit duement conuict encourge la peyne & C marcz
apaiero au Roy per leſtretz & leſchequer ſuiſdit Et en cas que aſcun ſe
ſente eſtre greuez par execucion ou autre voie en celle partie encounter
droit ⁊ remedie ¶ Ca ys C Item le roy per meſne ⁊ taſſent & les di
tes ſeignoure ⁊ Chiualers eſtre aſſignez par la dite auctoure du parlemẽt
dyet ⁊ ad oyer ⁊ determiner que eſtatute qui peure ou purſue & repeller ou renuer
ſer aſcuns les dites eſtatutes ou ordenaunce faitz par le roy & taſſent les
dits ſeignoure ⁊ eſtandre iſſint aſſignez par maiſ ⁊ auctoure du parle-
ment ⁊ ceo ouement peine en parlement que il ſoit adiugges ⁊ eit execu
cion come tauſour au roy ⁊ a roialme en meſme le maniere come ceux
qi purſuont ou peuront & repeller les eſtatutz ⁊ ordenaunces faitz en le
temps du dit parlement durant

Expliciunt ſtatuta Regis Ricardi ſecundi

Taken from a black-letter volume in the Author's library, containing the statutes of Richard the Second, written in Norman French.

To the Antiquarian this application of the photographic art seems destined to be of great advantage.

Copied of the size of the original, by the method of superposition.

PLATE IX

FAC-SIMILE OF AN OLD PRINTED PAGE

PLATE X
THE HAYSTACK

One advantage of the discovery of the Photographic Art will be, that it will enable us to introduce into our pictures a multitude of minute details which add to the truth and reality of the representation, but which no artist would take the trouble to copy faithfully from nature.

Contenting himself with a general effect, he would probably deem it beneath his genius to copy every accident of light and shade; nor could he do so indeed, without a disproportionate expenditure of time and trouble, which might be otherwise much better employed.

Nevertheless, it is well to have the means at our disposal of introducing these minutiae without any additional trouble, for they will sometimes be found to give an air of variety beyond expectation to the scene represented.

PLATE XI

COPY OF A LITHOGRAPHIC PRINT

We have here the copy of a Parisian caricature, which is probably well known to many of my readers.

All kinds of engravings may be copied by photographic means; and this application of the art is a very important one, not only as producing in general nearly fac-simile copies, but because it enables us at pleasure to alter the scale, and to make the copies as much larger or smaller than the originals as we may desire.

The old method of altering the size of a design by means of a pantagraph or some similar contrivance, was very tedious, and must have required the instrument to be well constructed and kept in very excellent order: whereas the photographic copies become larger or smaller, merely by placing the originals nearer to or farther from the Camera.

The present plate is an example of this useful application of the art, being a copy greatly diminished in size, yet preserving all the proportions of the original.

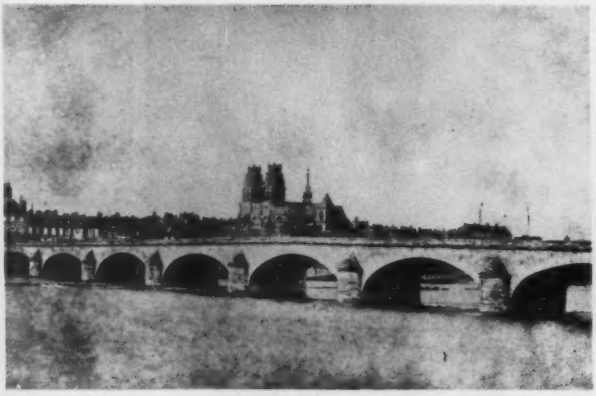


PLATE XII

THE BRIDGE OF ORLEANS

This view is taken from the southern bank of the river Loire, which passes Orleans in a noble stream.

A city rich in historical recollections, but at present chiefly interesting from its fine Cathedral; of which I hope to give a representation in a subsequent plate of this work.

PLATE XIII

QUEEN'S COLLEGE, OXFORD

Entrance Gateway

In the first plate of this work I have represented an angle of this building. Here we have a view of the Gateway and central portion of the College. It was taken from a window on the opposite side of the High Street.

In examining photographic pictures of a certain degree of perfection, the use of a large lens is recommended, such as elderly persons frequently employ in reading. This magnifies the objects two or three times, and often discloses a multitude of minute details, which were previously unobserved and unsuspected. It frequently happens, moreover – and this is one of the charms of photography – that the operator himself discovers on examination, perhaps long afterwards, that he has depicted many things he had no notion of at the time. Sometimes inscriptions and dates are found upon the buildings, or printed placards most irrelevant, are discovered upon their walls: sometimes a distant dial-plate is seen, and upon it – unconsciously recorded – the hour of the day at which the view was taken.

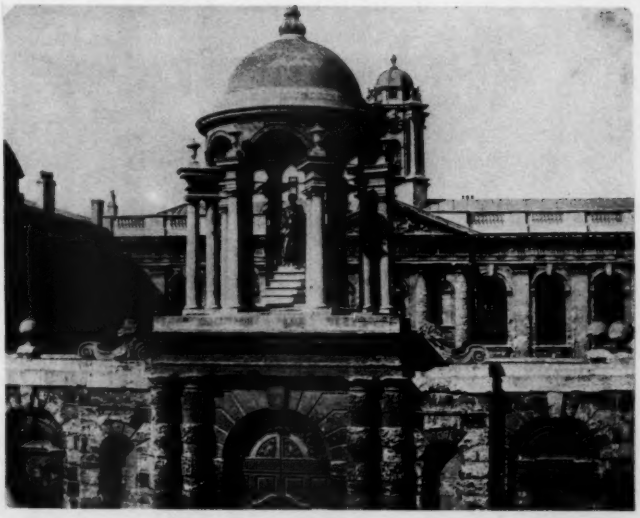
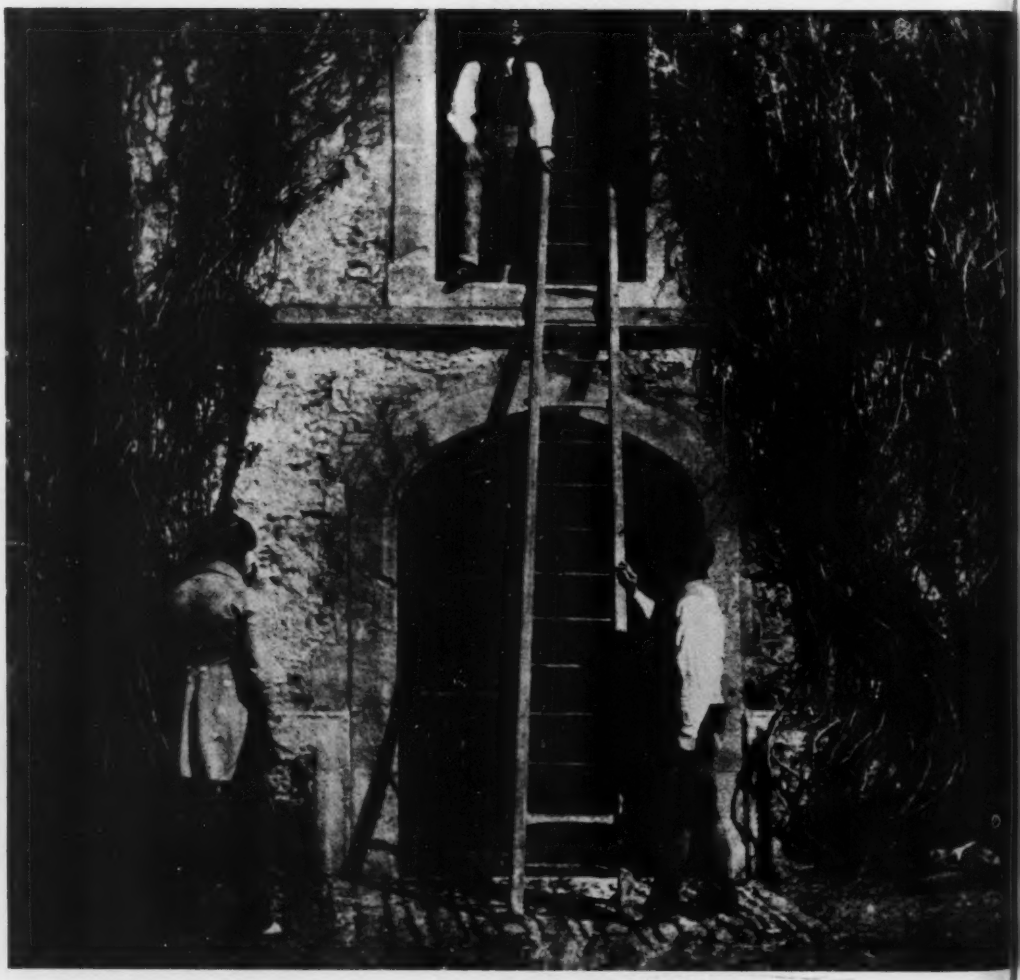


PLATE XIV

THE LADDER

Portraits of living persons and groups of figures form one of the most attractive subjects of photography, and I hope to present some of them to the Reader in the progress of the present work.

When the sun shines, small portraits can be obtained by my process in one or two seconds, but large portraits require a somewhat longer time. When the weather is dark and cloudy, a corresponding allowance is necessary, and a greater demand is made upon the patience of the sitter. Groups of figures take no longer time to obtain than single figures would require, since the Camera depicts them all at once, however



numerous they may be: but at present we cannot well succeed in this branch of the art without some previous concert and arrangement. If we proceed to the City, and attempt to take a picture of the moving multitude, we fail, for in a small fraction of a second they change their positions so much, as to destroy the distinctness of the representation. But when a group of persons has been artistically arranged, and trained by a little practice to maintain an absolute immobility for a few seconds of time, very delightful pictures are easily obtained. I have observed that family groups are especial favourites: and the same five or six individuals may be combined in so many varying attitudes, as to give much interest and a great air of reality to a series of such pictures. What would not be the value to our English Nobility of such a record of their ancestors who lived a century ago? On how small a portion of their family picture galleries can they really rely with confidence!

PLATE XV

LACOCK ABBEY IN WILTSHIRE

One of a series of views representing the Author's country seat in Wiltshire. It is a religious structure of great antiquity, erected early in the thirteenth century, many parts of which are still remaining in excellent preservation.

This plate gives a distant view of the Abbey, which is seen reflected in the waters of the river Avon. The spectator is looking to the North West. The tower which occupies the South-eastern corner of the building is believed to be of Queen Elizabeth's time, but the lower portion of it is much older, and coeval with the first foundation of the abbey.

In my first account of "The Art of Photogenic Drawing," read to the Royal Society in January, 1839, I mentioned this building as being the first "that was ever yet known to have drawn its own picture."

It was in the summer of 1835 that these curious self-representations were first obtained. Their size was very small: indeed, they were but miniatures, though very distinct: and the shortest time of making them was nine or ten minutes.

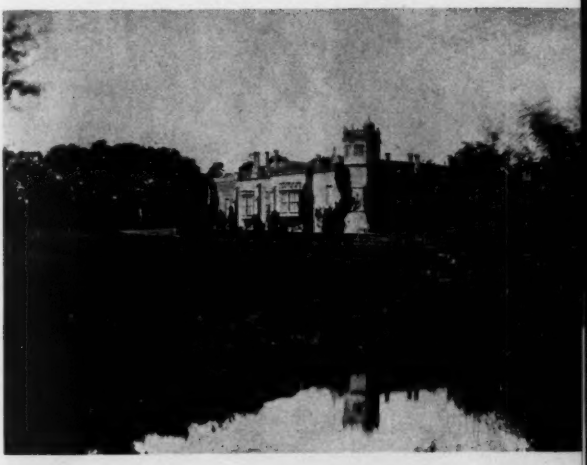


PLATE XVI

CLOISTERS OF LACOCK ABBEY

The Abbey was founded by Ela, Countess of Salisbury, widow of William Longspee, son of King Henry II. and Fair Rosamond.

This event took place in the year of our Lord 1229, in the reign of Henry III. She was elected to be the first abbess, and ruled for many years with prudence and piety. She lies buried in the cloister, and this inscription is read upon her tomb:

> Infrà sunt defossa Elae venerabilis ossa,
> Quae dedit has sedes sacras monialibus aedes, Abbatissa quidem quae sanctè vixit ibidem, Et comitissa Sarum virtutum plena bonarum.

The cloisters, however, in their present state, are believed to be of the time of Henry VI. They range round three sides of a quadrangle, and are the most perfect which remain in any private residence in England. By moonlight, especially, their effect is very picturesque and solemn.

Here, I presume, the holy sisterhood often paced in silent meditation; though, in truth, they have left but few records to posterity to tell us how they lived and died. The "liber de Lacock" is supposed to have perished in the fire of the Cottonian library. What it contained I know not – perhaps their private memoirs. Some things, however, have been preserved by tradition, or discovered by the zeal of antiquaries, and from these materials the poet Bowles has composed an interesting work, the History of Lacock Abbey, which he published in 1835.

PLATE XVII

BUST OF PATROCLUS

Another view of the bust which is figured in the fifth plate of this work.

It has often been said, and has grown into a proverb, that there is no royal road to learning of any kind. But the proverb is fallacious: for there is, assuredly, a royal road to *Drawing;* and one of these days, when more known and better explored, it will probably be much frequented. Already sundry *amateurs* have laid down the pencil and armed themselves with chemical solutions and with *camerae obscurae*. Those amateurs especially, and they are not few, who find the rules of *perspective* difficult to learn and to apply – and who moreover have the misfortune to be lazy – prefer to use a method which dispenses with all that trouble. And even accomplished artists now avail themselves of an invention which delineates in a few moments the almost endless details of Gothic architecture which a whole day would hardly suffice to draw correctly in the ordinary manner.

PLATE XVIII

GATE OF CHRISTCHURCH

The principal gate of Christchurch College in the University of Oxford.

On the right of the picture are seen the buildings of Pembroke College in shade.

Those who have visited Oxford and Cambridge in vacation time in the summer must have been struck with the silence and tranquillity which pervade those venerable abodes of learning.

Those ancient courts and quadrangles and cloisters look so beautiful so tranquil and so solemn at the close of a summer's evening, that the spectator almost thinks he gazes upon a city of former ages, deserted, but not in ruins; abandoned by man, but spared by Time. No other cities in Great Britain awake feelings at all similar. In other towns you hear at all times the busy hum of passing crowds, intent on traffic or on pleasure – but Oxford in the summer season seems the dwelling of the Genius of Repose.

PLATE XIX

THE TOWER OF LACOCK ABBEY

The upper part of the tower is believed to be of Queen Elizabeth's time, but the lower part is probably coeval with the first foundation of the abbey, in the reign of Henry III.

The tower contains three apartments, one in each story. In the central one, which is used as a muniment room, there is preserved an invaluable curiosity, an original copy of the Magna Charta of King Henry III. It appears that a copy of this Great Charter was sent to the sheriffs of all the counties in England. The illustrious Ela, Countess of Salisbury, was at that time sheriff of Wiltshire (at least so tradition confidently avers) and this was the copy transmitted to her, and carefully preserved ever since her days in the abbey which she founded about four years after the date of this Great Charter.

Of the Magna Charta of King John several copies are still extant; but only two copies are known to exist of the Charter of his successor Henry III, which bears date only ten years after that of Runnymede. One of these copies, which is preserved in the north of England, is defaced and wholly illegible; but the copy preserved at Lacock Abbey is perfectly clear and legible throughout, and has a seal of green wax appended to it, inclosed in a small bag of coloured silk, which six centuries have faded.

The Lacock copy is therefore the only authority from which the text of this Great Charter can be correctly known; and from this copy it was printed by Blackstone, as he himself informs us.

From the top of the tower there is an exten-

sive view, especially towards the South, where the eye ranges as far as Alfred's Tower, in the park of Stour-head, about twenty-three miles distant.

From the parapet wall of this building, three centuries ago, Olive Sherington, the heiress of Lacock, threw herself into the arms of her lover, a gallant gentleman of Worcestershire, John Talbot, a kinsman of the Earl of Shrewsbury. He was felled to the earth by the blow, and for a time lay lifeless, while the lady only wounded or broke her finger. Upon this, Sir Henry Sherington, her father, relented, and shortly after consented to their marriage, giving as a reason *"the step which his daughter had taken."*

Unwritten tradition in many families has preserved ancient stories which border on the marvellous, and it may have embellished the tale of this lover's leap by an incident belonging to another age. For I doubt the story of the broken finger, or at least that Olive was its rightful owner. Who can tell what tragic scenes may not have passed within these walls during the thirteenth and fourteenth centuries? The spectre of a nun with a bleeding finger long haunted the precincts of the abbey, and has been seen by many in former times, though I believe that her unquiet spirit is at length at rest. And I think the tale of Olive has borrowed this incident from that of a frail sister of earlier days.

PLATE XX

LACE

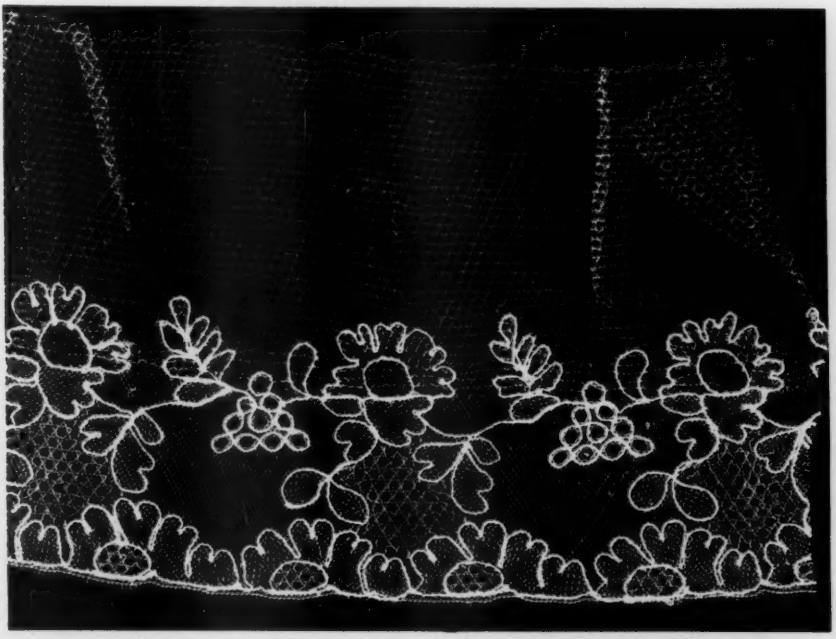
As this is the first example of a *negative* image that has been introduced into this work, it may be necessary to explain, in a few words, what is meant by that expression, and wherein the difference consists.

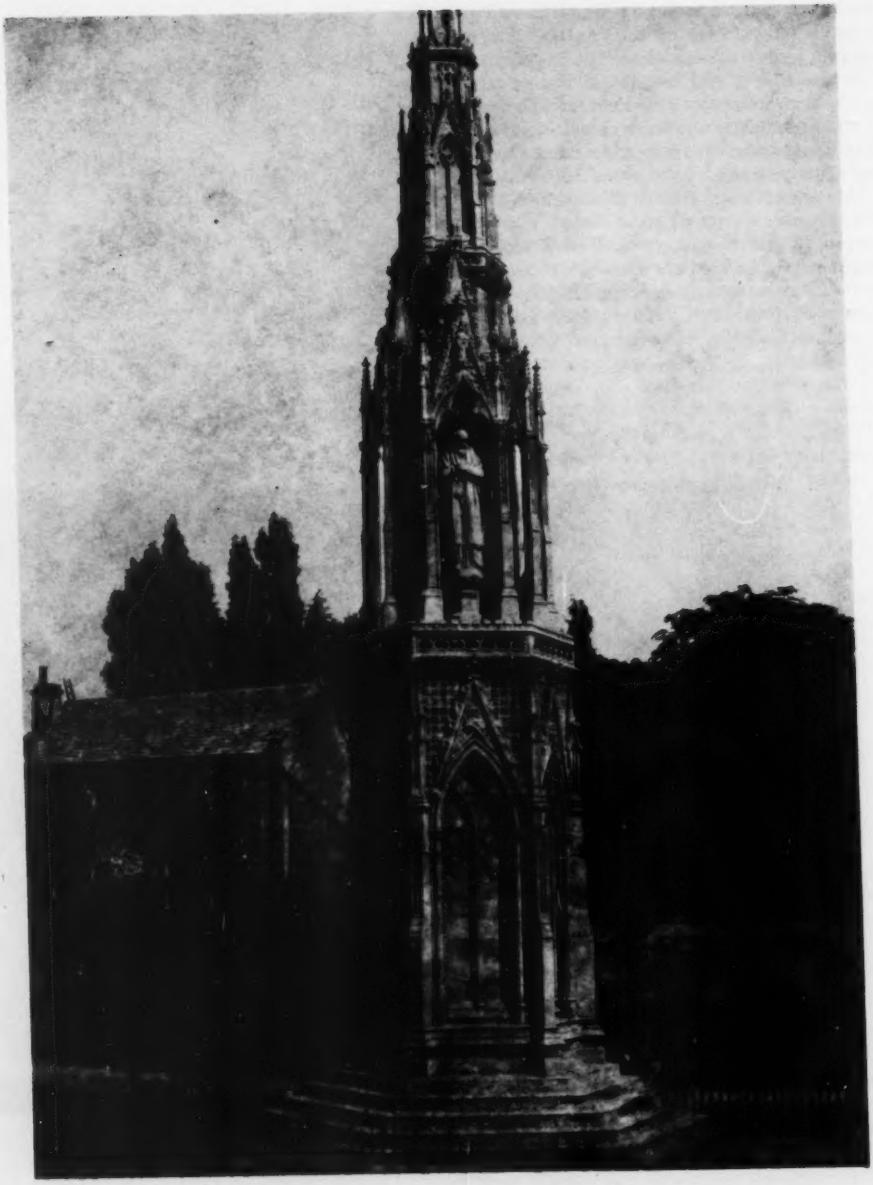
The ordinary effect of light upon white sensitive paper is to *blacken* it. If therefore any object, as a leaf for instance, be laid upon the paper, this, by intercepting the action of the light, preserves the whiteness of the paper beneath it, and accordingly when it is removed there appears the form or shadow of the leaf marked out in white upon the blackened paper; and since shadows are usually dark, and this is the reverse, it is called in the language of photography a *negative* image.

This is exemplified by the lace depicted in this plate; each copy of it being an original or negative image: that is to say, directly taken from the lace itself. Now, if instead of copying the lace we were to copy one of these negative images of it, the result would be a *positive* image of the lace: that is to say, the lace would be represented *black* upon a *white* ground. But in this secondary or positive image the representation of the small delicate threads which compose the lace would not be quite so sharp and

distinct, owing to its not being taken directly from the original. In taking views of buildings, statues, portraits, &c. it is necessary to obtain a *positive* image, because the negative images of such objects are hardly intelligible, substituting light for shade, and *vice versâ*. But in copying such things as lace or leaves of plants, a negative image is perfectly allowable, black lace being as familiar to the eye as white lace, and the object being only to exhibit the pattern with accuracy.

In the commencement of the photographic art, it was a matter of great difficulty to obtain good *positive* images, because the original or negative pictures, when exposed to the sunshine, speedily grew opaque in their interior, and consequently would not yield any positive copies, or only a very few of them. But, happily, this





difficulty has been long since surmounted, and the negative or original pictures now always remain transparent during the process of copying them.

PLATE XXI

THE MARTYRS' MONUMENT

Oxford has at length, after the lapse of three centuries, raised a worthy monument to her martyred bishops, who died for the Protestant cause in Queen Mary's reign.

And we have endeavoured in this plate to represent it worthily. How far we have succeeded must be left to the judgment of the gentle Reader.

The statue seen in the picture is that of Bishop Latimer.

PLATE XXII

WESTMINSTER ABBEY

The stately edifices of the British Metropolis too frequently assume from the influence of our smoky atmosphere such a swarthy hue as wholly to obliterate the natural appearance of the stone of which they are constructed. This sooty covering destroys all harmony of colour, and leaves only the grandeur of form and proportions.

This picture of Westminster Abbey is an instance of it; the façade of the building being strongly and somewhat capriciously darkened by the atmospheric influence.

PLATE XXIII

HAGAR IN THE DESERT

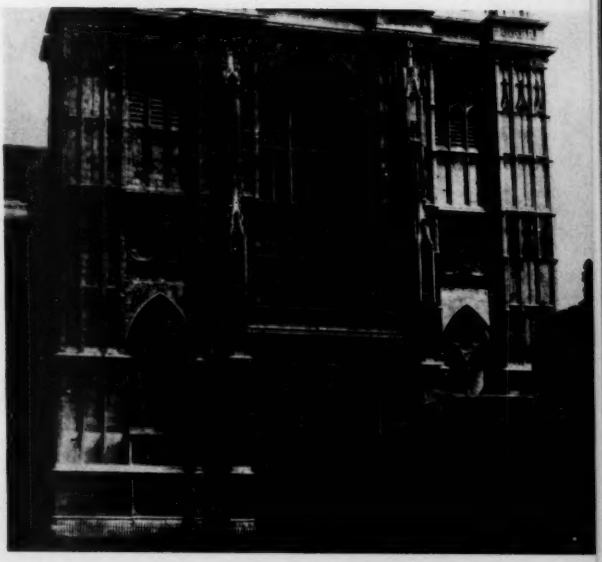
This Plate is intended to show another important application of the photographic art. Facsimiles can be made from original sketches of the old masters, and thus they may be preserved from loss, and multiplied to any extent.

This sketch of Hagar, by Francesco Mola, has been selected as a specimen. It is taken from a fac-simile executed at Munich. The photographic copying process here offers no difficulty, being done of the natural size, by the method of superposition.

PLATE XXIV

A FRUIT PIECE

The number of copies which can be taken from a single original photographic picture, appears to be almost unlimited, provided that every portion of iodine has been removed from the picture before the copies are made. For if any of it is left, the picture will not bear repeated copying, but gradually fades away. This arises from the chemical fact, that solar light and a minute por-



tion of iodine, acting together (though neither of them separately), are able to decompose the oxide of silver, and to form a colourless iodide of the metal. But supposing this accident to have been guarded against, a very great number of copies can be obtained in succession, so long as great care is taken of the original picture. But being only on paper, it is exposed to various accidents; and should it be casually torn or defaced, of course no more copies can be made. A mischance of this kind having occurred to two plates in our earliest number after many copies had been taken from them, it became necessary to replace them by others; and accordingly the Camera was once more directed to the original objects themselves, and new photographic pictures obtained from them, as a source of supply for future copies. But the circumstances of light and shade and time of day, &c. not altogether corresponding to what they were on a former occasion, a slightly different but not a worse result attended the experiment. From these remarks, however, the difference which exists will be easily accounted for.

INGMAR BERGMAN

Harriet Andersson, GYCKLARNAS AFTON

BETWEEN MARCH 26 AND JULY 12 this year the National Film Theatre in London will be showing twenty Swedish dialogue films in a series called "The Passionate Cinema." Half of the twenty scheduled were directed by Ingmar Bergman and he is credited with the scenario for two of the remaining ten.

Discussing the Bergman films in *The Saturday Review* (March 21, 1959) Hollis Alpert observed: "It's already possible to determine whether someone is middlebrow or upperbrow, depending on whether the word Bergman suggests Ingmar or Ingrid."

As early as 1952, Forsyth Hardy in his excellent book *Scandinavian Film,* singled out Bergman as "the outstanding figure of the new period" in Swedish films. The

most informative piece on Ingmar Bergman that has been published in English is the work of the young Danish critic Erik Ulrichsen whose "Ingmar Bergman and the Devil" appeared in the Summer 1958 issue of *Sight and Sound.*

In addition to Sjoberg's *Hets* (Frenzy, Torment) (1944) which marked Bergman's entrance to the cinema field as scenarist, the Eastman House Motion Picture Study Collection includes three films both written and directed by Ingmar Bergman. Like all other films in the Collection, they are available for screening and study at Eastman House.

SKEPP TILL INDIALAND *(Ship of Dreams)* was produced in 1947, adapted by Bergman from a play. The third film of the very young Swedish director (then 29), *Ship of Dreams* clearly marked the pattern that was to become almost a creative obsession until 1955. In this case the typical Bergman conflict is between a harsh, brutally self-indulgent father, captain of a salvage vessel, and his slightly crippled son. To the confined quarters of his ship, the father brings his young mistress to live on board in defiance of his wife and rebellious son.

SUMMER WITH MONIKA was made in 1953. It concentrated on the affair of two teen-agers who, fed up with their dismal city jobs and dreary home-life, escape in a small boat for a summer of gypsy life that brings them, along with their idyllic freedom, close to the border of serious crime. At the end of summer, running out of sunshine and supplies, they retreat to the city and disaster. The girl is pregnant; they marry, the girl finds her child and their poverty too much of a burden. She betrays her still idealistic young husband with his one enemy. Bergman directed the young actress Harriet Andersson with such skillful effect that even after so long a line of remarkable performances by Swedish actresses in mind, her apparently total indifference to the camera is astonishingly effective.

GYCKLARNAS AFTON *(Sawdust and Tinsel)* was also made in 1953 and again Bergman presented Harriet Andersson, this time flanked by Ake Groenberg who seemed to be imitating Kortner in typically Pabstian, Teutonic anguish and by Hasse Ekman, son of the late Gosta Ekman. Ekman, perfectly cast as a flamboyant actor brought a brilliance and style to his role of a bravura quality not usually found in Bergman's films.

Although six years (and, incredibly, eight other pictures) separate these films, all three are characterized by typical Bergmanisms. In each the protagonist suffers a vicious and humiliating physical beating at the hands of his love rival and in each he is betrayed by the infidelity of his beloved. Bergman becomes a kind of specialist too in erotic claustrophobia: the crowded cabins in *Ship of Dreams* have their counterpart in the even tinier confines of the circus van in *Sawdust and Tinsel.* Not satisfied even with the spatial limitation of the tomb-like bunk area of the small pleasure craft of *Summer With Monika,* Bergman has his escapist teen-agers share a sleeping-bag.

Sawdust and Tinsel has not been widely circulated in the United States. Along with *Ship of Dreams,* it is recommended for the study of those interested in the surprising career of this forty-year-old director who has, since his first film in 1946, directed no less than eighteen films with seven of them provoking international attention. In Paris not long ago, five of Ingmar Bergman's films were on view at the same time.

JAMES CARD

BOOK REVIEWS

DER WEG DES FILMS; die Geschichte der Kinematographie und ihrer Vorläufer, von Friedrich von Zglinicki. Berlin: Rembrandt-Verlag. 1956. 992 pp. 890 illus.

UNLIKE MOST FILM HISTORIANS, Friedrich von Zglinicki recognizes that the art of motion pictures is a part of the history of photography, and he devotes some 50 pages of his monumental book to a seemingly detailed study of the origins of photography and its development up to the point when it became possible to make instantaneous exposures at shutter speeds less than a sixteenth of a second which were suitable for intermittent viewing to recreate the illusion of time. We wish that his research had been sounder. It is unbelievable, for example, that a book of such encyclopedic pretensions as this unwieldy volume should, in the year 1956, make no mention of the discovery by Helmut and Alison Gernsheim of the world's first photograph taken by Niépce in 1826. The treatment of William Henry Fox Talbot is inadequate, and the dating of the calotype technique with development of a latent image in 1839 is wholly erroneous. We bow to the author's lavish praise of the George Eastman House, but we are unhappy that the basic facts of George Eastman's contributions are so unsatisfactorily described. Eastman never called his "American Film" a stripping film; his company was not called the Eastman Kodak Company until 1892; transparent film – the life blood of the moving pictures – was not introduced until 1889.

Errors of fact in the history of photography might be overlooked in a history of film, but we have to record that there are inaccuracies equally misleading in his account of the beginnings of the motion picture. Von Zglinicki does Eastman House the honor of reproducing from IMAGE (April, 1952) – with credit – the extraordinary series of sequence pictures of a galloping horse drawn on the rim of a phenakistoscope disk by the French cavalry officer L. Wachter in 1862. While these images anticipate Muybridge by some 15 years in the exactness of their observation, they were not due to photography, and it is wholly inexact to cite them on the authority of IMAGE in proof of the statement that "Eadweard Muybridge was not the first photographer to take a series of photographs (*Reihenaufnahmen*) of a galloping horse, but rather the Frenchman L. Wachter . . ." It is unbelievable that the author should date the famous Muybridge photographs of a galloping horse 1872, when the very photograph which he reproduces bears on it the correct date of 1878. Edison's kinetoscope was not shown at the Chicago World's Fair of 1893, even

though it had been the intention of Edison to do so. Armat's original 1895 projector did not make use of a Maltese cross, but had a simple beater movement, as can be seen in the illustration of the inventor's own model, now in the George Eastman House, which is reproduced without credit or other indication of its present whereabouts.

Despite our disappointment at the inaccuracy of research which these test borings of Von Zglinicki's massive volume have disclosed, we are glad to see a film historian directing his attention to a precursor of theatrical motion pictures so obvious that it has been generally overlooked. This is the elaborate magic lantern show, with dissolving views (from which sprang the lap-dissolves of the motion picture cameraman) close ups, panorams, musical background, and commentary.

Von Zglinicki's treatment of the forerunners of cinematography and its early years, in Germany in particular, seems to us sounder – despite the inaccuracies which we have noted – than his treatment of the film since 1920. Understandably he devotes more space to German films than to those of other countries.

The wealth of illustrations gives the book special value as a reference work.

BEAUMONT NEWHALL

KNAURS BUCH VOM FILM by Rune Waldekranz and Verner Arpe. Droemersche Verlagsanstalt, Th. Knaur Nachf. Munich. 1956. 543 pages, 600 illustrations D.M. 9.80.

THE FAMILIAR GERMAN KNAURS, miniature lexicons which have already attended to such subjects as opera, architecture, painting and photography, now offer a handy, well-produced reference work on motion pictures. The compact volume includes six hundred movie stills, 350 brief biographies of film artists, over one hundred film synopses and a curious bibliography of "filmed world literature" (curious because of its omissions: Charlotte Bronte is included but Emily is missing).

It is surprising that the traditional German lexicographers turned to Swedish authors for this motion picture work. Rune Waldekranz is a noted producer with such films as *Miss Julie* and *Sawdust and Tinsel* to his credit. Perhaps the book would be more reliable as a reference work had a full-time historian undertaken the task. As it is, the book is marred by misleading errors. Ince's *Typhoon* is described as the first film to deal with a catastrophe of nature. (It is about a murder trial in Paris.) *White Shadows in the South Seas* is cited as the first sound film in the Polynesian milieu but this picture was silent. In describing the Japanese film *Himeyuri-no-to,* a picture which dealt with the American invasion of Okinawa, the authors' inaccuracies become irresponsible when they state "the film tells how helpless girls were raped by soldiers and kidnapped." One of the most striking features of *Himeyuri-no-to* is that in director Imai's entire, lengthy war film, not one single enemy soldier was ever glimpsed.

JAMES CARD

PRINTING WITH VARIABLE CONTRAST PAPERS, by M. Richard Marx. San Francisco: Camera Craft Publishing Co., 1959. 96 pp. 86 illus. $1.95.

In 1912 Rudolf Fischer of Berlin received British patent 15,054 for a method of making photographic printing paper of variable contrast: he proposed to coat the paper with two emulsions, each of different color sensitivity and of different contrast. By choosing the appropriate color for the illuminant while printing, a contrast to match the negative could be secured. Fischer's process appears never to have been used; like his invention of the multi-layer emulsion and dye-coupling development, it was left for others to re-discover the principles.

This was done in 1940, when F. F. Renwick of Ilford, Ltd., invented "Multigrade paper." In his announcement of this product before the Royal Photographic Society, Renwick stated that he and his associates "only discovered this patent (Fischer's) several months after we had got to work upon this subject."

For years "VC paper," as the author terms the product, was offered by only one company, but now practically all manufacturers have their "VC" papers. Mr. Marx has therefore completely revised his 1954 book *Printing with "Varigam"* to include these products. A somewhat over-simplified description of the principle upon which VC papers work is given, together with an historical note on Rudolf Fischer's patent.

Beaumont Newhall

BOOKS RECEIVED

Film: Book 1; THE AUDIENCE AND THE FILMMAKER. Edited by Robert Hughes. New York: Grove Press, Inc., 1959. 158 pp. plus 24 pp. of illustrations.

HUNDERT JAHRE PHOTOGRAPHIE 1839-1939 aus der Sammlung Gernsheim, London. Essen: Museum Folkwang, 1959. 30 pp. plus 48 illus.

Otto Steinert und Schüler: GESTALTISCHE FOTOGRAFIE. Essen: Museum Folkwang, 1959. 60 pp. plus 28 illus.

GELIEBTE SEKUNDE; das Foto in unserer Welt. Von Rudolf Baucken. München: Paul List Verlag, 1958. 142 pp. plus 6 illus.

NEWS AND NOTES

HISTORY OF GERMAN PHOTOGRAPHIC INDUSTRY

A WEALTH OF HISTORICAL INFORMATION, especially pertaining to the German photographic industry, will be found in the January, 1959, issue of *Photo-Magazin*, (Munich). The earliest developments in photography are described, along with reproductions of portraits of the pioneers of photography. A considerable part of the first article, (there are five articles on various phases of the history of photography), is devoted to reprinting excerpts from contemporary journals describing new ideas. A number of early photographic devices are illustrated. Also included is a reprint of Beaumont Newhall's article on Photo-Sculpture which appeared in the May, 1958, issue of IMAGE. The last two articles survey some of the more interesting and amusing patents for photographic devices in the German patent archive.

INSTANTANEOUS PHOTOGRAPHS

A SERIES OF FOUR 1884 instantaneous photographs of the Oxford-Cambridge boat race, taken by Wratten & Wainwright, are published in the *British Journal of Photography*, March 27, 1959. They were described in the April 18, 1884 issue of the magazine. The prints were supplied by Dr. R. S. Schultze, Curator of the Kodak Museum, Harrow.

APPRAISAL OF THE MARCH OF TIME

RAYMOND FIELDING, "Mirror of Discontent: The *March of Time* and Its Politically Controversial Film Issues," *Western Political Quarterly*, XII (March, 1959), 145-52. Not illus.

An appraisal of the *March of Time* films which, the author claims, have influenced current television news features. The film "Inside Nazi Germany," released on January 20, 1938, is analyzed, with extensive quotations from critics. It is noted that the film was received both as pro-Nazi and anti-Nazi, and that the visual story contrasted strongly with the commentary. The author refers to his earlier historical appraisal of the *March of Time* which appeared in the *Quarterly of Film, Radio and Television*, XI (1957), 354-61.

DAVID OCTAVIUS HILL

A. HYATT MAYOR, Curator of Prints, for the Metropolitan Museum of Art, New York, describes the career of David Octavius Hill in an article entitled "The First Victorian Photographer," appearing in the December, 1958, issue of the *Metropolitan Museum of Art Bulletin*. Based on the Hill photographs in the Metropolitan's print collection, twelve of which are shown, Mayor presents a lucid biography of the Scottish photographer, as well as a graphic description of the process he used and the era which fostered it. Of special interest is an account of Hill's late, and comparatively unknown, work with the photographer A. McGlashon. Single copies are available from the museum at 50¢ a copy.

QUARTERLY NOTES FROM THE GEORGE EASTMAN HOUSE

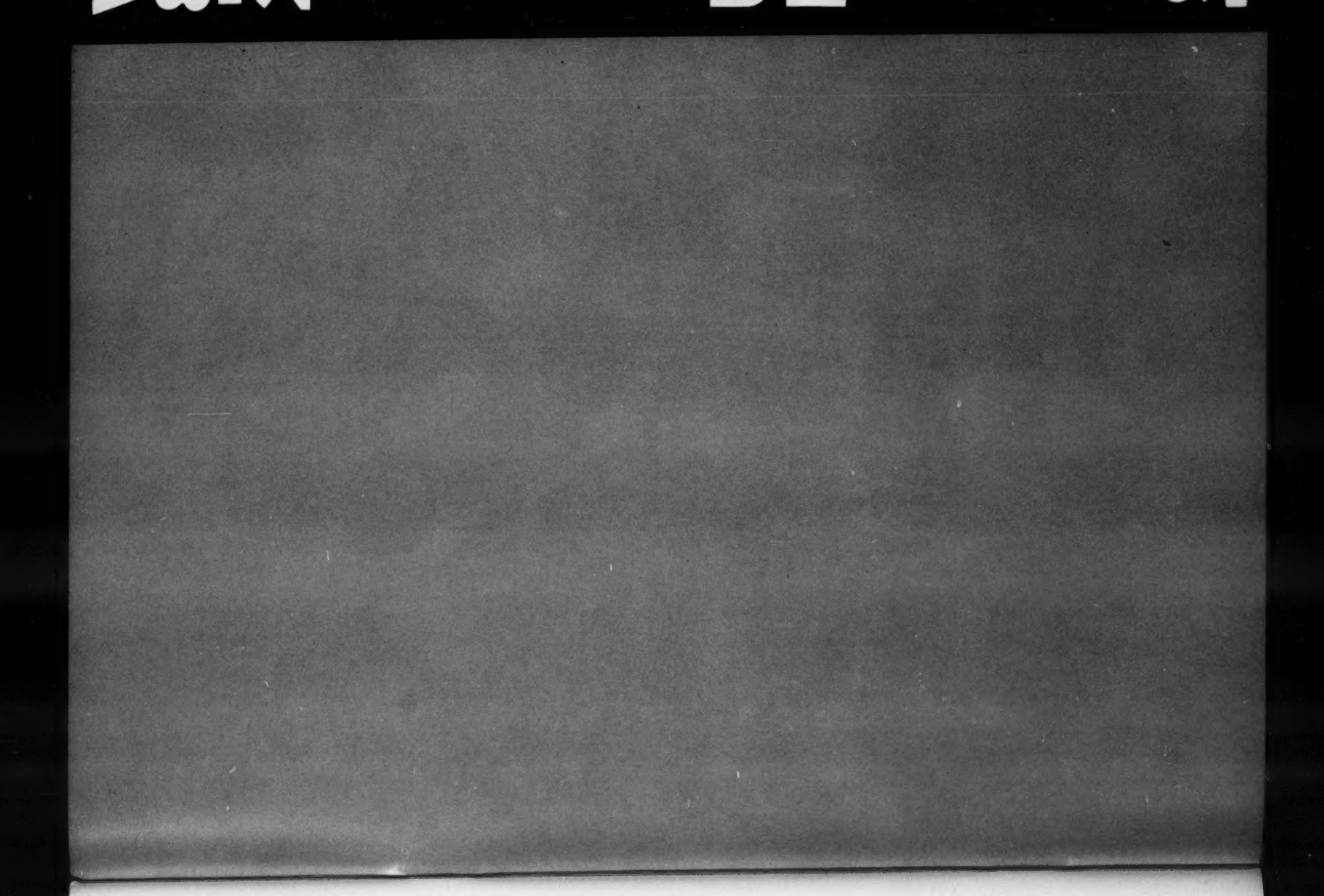
DURING THE PAST QUARTER a special exhibition was on view in the Dryden Gallery of photographs by Minor White, formerly a member of the staff of the George Eastman House and now an instructor in photography at the Rochester Institute of Technology. Titled "Return to the Bud," the show consists of 29 panels, on each of which are photographs and text, both by Mr. White. Poetic in concept, the sequence is at once a collection of photographs taken by Mr. White over a period of 20 years and a stimulating experiment in the juxtaposition of photographs and words. "Return to the Bud" will be circulated throughout the country as part of the George Eastman House Traveling Exhibition Program.

Several years ago, a large collection of photographs by the late Francis Bruguière was deposited at Eastman House by Miss Rosalinde Fuller. Bruguière, best known as the official photographer of the Theatre Guild was one of the first to experiment with abstract photography. As early as 1912 he was making non-objective photographs. A selection of this early work, and later examples of solarization and double exposure, has been on display in the contemporary gallery.

Through the cooperation of the Color Corporation of America, large color transparencies of some of the most striking motion studies of Ernst Haas have been installed in the color room. The finest contemporary publication of photographs of the Civil War is the two-volume *Photographic Sketch Book of the War*, published 1865-1866, containing one hundred actual photographic prints. Eastman House is fortunate in having two sets of this rare publication, which includes the work of T. H. O'Sullivan and Alexander Gardner, best known as cameramen of Mathew B. Brady before they left his employ. Twenty-nine of these photographs have been framed individually, to form an exhibition which after its showing at Eastman House will be added to the traveling exhibition program.

The Associates Lending Library has proved to be such a success that we have increased the number of books offered and have added a number of rare volumes on the motion picture. A list of the new additions is available for Associates. Associates may borrow these books by mail at no charge beyond the cost of shipping and insurance.

Mr. Harold White of Bromley, Kent, England, has given the George Eastman House a paper negative by Fox Talbot, taken of Lacock Abbey in 1835. The negative is one of the earliest in existence, and it is the only example in our collection of Talbot's "photogenic drawing" process, when he used sodium chloride as a fixing agent instead of sodium thiosulphate. Because the negative is not stable to light, it is not possible to put it on display.

Photographs from the George Eastman House were used in the NBC-TV documentary production "Meet Mr. Lincoln."

The response of Associates to the new format of IMAGE has been most encouraging. To the many who have taken the trouble to write us in appreciation, we are grateful.